Geology, Exploration and Mining in British Columbia

1970

British Columbia Department of Mines and Petroleum Resources

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CHAPTER 1

Introduction

The first Minister of Mines of the Province of British Columbia was appointed in 1874. One of his responsibilities was "the duty of collecting information on the subject of the mining industries of the Province." This material, which consisted of reports by the Gold Commissioners and Mining Recorders of the Province, was published in the Annual Report of the Minister of Mines.

A Bureau of Mines was established by Parliamentary authority in 1895 and in 1896 was staffed by a Provincial Mineralogist and an assayer and chemist. Technical reports on mines and mining activities were prepared by them and published in the Annual Report, together with reports contributed by the Mining Recorders and Gold Commissioners.

Over the years with the expansion of the mining industry, the staff of the Department of Mines grew, as did the number and size of the technical reports on geology and mining that were still published in the Annual Report of the Minister of Mines. Over a period of nearly 75 years the Annual Report became known as the authoritative record of mining in the Province.

However, in 1969, because of the size to which the Annual Report had grown, it was decided to publish all geological and technical reports on Metal Mining and Exploration, Placer, Structural Materials and Industrial Minerals, and Coal Mining and Exploration in a separate volume entitled *Geology, Exploration, and Mining in British Columbia*. Thus a new annual publication was initiated which, as a separate entity from the Annual Report, exists for the purpose of publishing geological and technical reports and of recording the exploration activity in the Province.

Later each year the Annual Report of the Minister of Mines and Petroleum Resources is published. It contains a general review of the mineral industry and chapters on Statistics, Departmental Work, Petroleum and Natural Gas, and Inspection of Mines.

CHAPTER 2

Metal Mines

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GENERAL REVIEW OF EXPLORATION AND METAL MINING

By Stuart S. Holland

PRODUCTION

Metal production in British Columbia continues to increase as properties which in past years have been under exploration and development are being brought into production. A new production record was set in 1970 with a value of $306,525,445, a gain of $11,744,331 or 3.95 per cent over 1969. This is the fifth consecutive year in which a new production record has been established. The increase is due to significant increases in the value of copper and molybdenum which, together with smaller increases in lead, nickel, and silver, more than compensate for decreased value of production of iron, zinc, and gold.

The value of gold production continues to decline as the Bralorne mine, the last gold mine in production in the Province, approaches the exhaustion of its ore reserves. The mine is expected to close in 1971. Because of the decline in Bralorne production, an increasing percentage of the gold is being contributed by base metal mines. In 1970 this amounted to about 60.8 per cent, compared with 60.1 per cent in 1969.

During the year the average price of silver declined from $1.93 per ounce in 1969 to $1.85 per ounce in 1970. Silver production in 1970 increased both in quantity and value despite the decline in average price. The increase is very largely due to production from the newly producing Annex, Brenda, Ruth Vermont, and Silmonac mines.

The average price of copper decreased from 66.66 cents per pound in 1969 to 58.70 cents in 1970. Copper production increased significantly during the year by 23.5 per cent in quantity but only 8.7 per cent in value. At $121,349,512 it is the most valuable metal produced in the Province.

Increased production resulted from expanded production from established mines such as the Lynx, Phoenix, Bethlehem, Old Sport, Pride of Emory, Tasu, and Texada, combined with new production from the Brenda, Magnum, and Greyhound mines. Only Britannia's and Granisle's productions were down.

Increased copper production in 1971 is predicted because of new production from Granduc mine at 7,500 tons per day, and a full year's production by Brenda mine at 24,000 tons per day. Production is also anticipated about mid-year from the Bull River mine and later in the year from the Island Copper mine.

The average prices of lead and zinc increased from 16.039 and 15.721 cents per pound respectively in 1969 to 16.336 and 16.006 cents per pound in 1970. Quantity and value of lead increased, whereas quantity and value of zinc decreased. Production is dominated by the Sullivan, Jersey, Reeves MacDonald, Bluebell, and

Lynx mines, zinc production from them was mostly down. New production was recorded from the Annex, Ruth Vermont, and Silmonac mines.

The Jersey mine ceased operation in August and the Annex mine replaced declining production from the Reeves MacDonald.

Production of iron concentrates declined both in quantity and value. Although production from Tasu increased slightly, that from Texada mine was less, as were the shipments from the stockpile at Brynnor (Kennedy Lake Division). No shipments were made from the Iron Mike and it has been announced that production of iron concentrates by Coast Copper Company Limited has ceased.

Production of molybdenum increased by 17.6 per cent in quantity and 9.2 per cent in value. Valued at $52,431,558, it is the second most valuable metal produced. The increase is very largely the result of new production from the Brenda and Mount Copeland mines.

Production of tungsten concentrates began with the opening of the Invincible mine and the start of milling operations in mid-October.

MINING

In 1970, 40,162,021 tons of ore from 66 mines was shipped or treated. This represents an increase in tonnage of 26.4 per cent over 1969. Of the mines, 9 produced more than 1,000,000 tons each, 14 produced between 100,000 and 1,000,000 tons, and 14 produced between 1,000 and 100,000.

Ten open-pit mines produced more than 26.4 million tons of ore. The two largest mines in the Province are the Endako mine at 10,118,000 tons and Brenda mine at 7,326,559 tons; both are open-pit operations. The largest underground mines are the Sullivan at 2,120,529 tons and Craigmont at 1,797,213 tons.

CONCENTRATING

In 1970, 37 concentrators were in operation—13 treated silver-lead-zinc ore, 9 treated copper ore, 2 treated copper-zinc ore, 5 treated molybdenum ore, 3 treated iron-copper ore, 1 treated nickel-copper ore, 2 treated gold-silver ore, 1 treated tungsten ore, and 1 treated mercury ore.

At Columbia Metals Corporation, Limited's True Fissure mine near Ferguson, preproduction development was done and construction of a 135-ton-per-day concentrator was started. Production from this silver-lead-zinc mine is expected in 1971.

At Copperline Mines Ltd.'s Ruth Vermont mine, preproduction development and concentrator construction were completed and production began in October at a rate of 600 tons per day of silver-lead-zinc ore. It is expected that the mill capacity will be increased to 700 tons per day in 1971.

Construction of a concentrator, 7,500-tons-per-day capacity, was completed by Granduc Operating Company to treat copper ore at the Granduc mine northwest of Stewart. The concentrator at Tide Lake began operation in November, and the first shipment of copper concentrates went to Japan in January 1971. The full capacity of the concentrator should be reached in mid-1971.

Construction of a concentrator of 2,000-tons-per-day capacity was completed by Greyhound Mines Ltd. to treat copper ore from the Greyhound pit at Greenwood. Operations began in August, and by October the mill was handling 1,800 tons per day. The mine closed by the end of the year and the company went into voluntary liquidation.

A concentrator, capacity 200 tons per day, was completed by King Resources Company to treat molybdenum ore from the Mount Copeland mine north of Revelstoke. Production began in June.

A concentrator, capacity 750 tons per day, was completed by Churchill Copper Corporation Ltd. to treat copper ore at its Magnum mine. The first concentrates were shipped in June.

A concentrator, capacity 150 tons per day, was completed by Trent Resources Ltd. and for a short time treated copper-molybdenum ore from the Golconda mine.

A concentrator, capacity 100 tons per day, was installed by Cinola Mines Ltd. and operated intermittently at the Midnight mine.

Rehabilitation of the old tungsten concentrator at the Emerald mine was completed and production of scheelite concentrates was begun in mid-October from ore from the Invincible mine. At year-end the concentrator was treating 430 tons of tungsten ore per day.

Concentrators were under construction at the following mines:

Lornex mine, Highland Valley, 38,000 tons per day, copper ore.

Island Copper mine, Rupert Inlet, 33,000 tons per day, copper ore.

Similkameen mine (Ingerbelle), Princeton, 15,000 tons per day, copper ore.

Pride of Emory mine, Emory Creek, 1,500 tons per day, nickel-copper ore, to replace the mill that was destroyed by fire in August.

Bull River mine, Bull River, 750 tons per day, copper ore.

True Fissure mine, Ferguson, 125 tons per day, silver-lead-zinc ore.

Milling at British Columbia Molybdenum mine was increased to about 10,000 tons per day, at Boss Mountain to 1,700 tons per day, and at Granisle mine to 6,550 tons per day.

Reeves MacDonald Mines Limited began milling ore from their newly developed Annex mine on the south side of the Pend-d'Oreille River, replacing declining production from the nearly depleted Reeves mine.

Kam-Kotia Mines Limited and Burkam Mines Ltd. in August began production at 150 tons per day of silver-lead-zinc ore from new ore developed in the Silmonac (old Silversmith-Ruth Hope) mine.

During the year, mining and milling operations were terminated by Utica Mines Ltd. (Horn Silver mine) and Greyhound Mines Ltd. (Greyhound pit). Coast Copper Company Limited discontinued production of iron concentrates but continues production of copper from the Benson Lake mine.

SMELTING

The only base metal smelter in operation in the Province is owned and operated by Cominco Ltd. at Trail. From mines in British Columbia it received 149,501 tons of lead concentrates and 186,067 tons of zinc concentrates from the company's Sullivan and Bluebell mines; 2,455 tons of lead concentrates, 941 tons of zinc concentrates, 12,850 tons of crude ore, and 763 tons of silver-gold concentrates, all of which were treated on a custom basis. In addition, the smelter also treated a large tonnage of ore, concentrates, and scrap from sources outside the Province, of which the company's Pine Point mine was a large contributor.

Products exported to American smelters were: Copper concentrates, 7,100 tons; lead concentrates, 9,916 tons; and zinc concentrates, 67,301 tons. The value of these products was $18,533,230. It represents about 6.0 per cent of the value of the 1970 metal production of the Province.

Products exported to Japanese smelters were: Copper concentrates, 384,894 tons; nickel-copper concentrates, 18,950 tons; lead concentrates, 773 tons; zinc concentrates, 4,321 tons; and iron concentrates, 1,674,293 tons. The value of the products was $143,242,473, an increase of $35,349,466 from 1969. It represents about 46.7 per cent of the value of the 1970 metal production of the Province.

DEVELOPMENT

Statistical returns from mining companies indicate that, in 1970, $63,609,810 was spent by companies in preproduction mine development, concentrator construction, provisions of power and transportation facilities, and in additions to plant capacities.

Preproduction development and (or) mill construction were being undertaken by the following:

Columbia Metals Corporation, Limited, True Fissure mine.
Copperline Mines Ltd., Ruth Vermont mine.
Dison Development Ltd., Sunloch and Gabbro mine.
Granduc Operating Company, Granduc mine.
Greyhound Mines, Ltd., Greyhound pit.
Kam-Kotia Mines Limited and Burkam Mines Ltd., Silmonac (old Silversmith-Ruth Hope).
King Resources Company, Mount Copeland mine.
Lornex Mining Corporation Ltd., Lornex mine.
Nadina Explorations Limited, Silver Queen mine.
Placid Oil Company, Bull River mine.
Utah Construction & Mining Co., Island Copper mine.

Announcements were made of the intention of putting the following mines into production:

Noranda Mines, Limited, Bell (Newman) mine, at 10,000 tons per day of copper ore in 1972.

Placer Development Limited, Gibraltar mine, at 30,000 tons per day of copper ore in 1972.

Similkameen Mining Company, Limited, Similkameen mine (Ingerbelle), at 15,000 tons per day of copper ore in 1972.

PROSPECTING AND EXPLORATION

Statistical returns received by the Economics and Statistics Branch, Department of Industrial Development, Trade, and Commerce, Victoria, indicate that $46,353,511 million was spent in prospecting and in the exploration of mining properties in the Province.

The number of mineral claims recorded in 1970 was 69,546, a 17.8-per-cent decrease from the 84,665 recorded in 1969. Recordings were less in all mining divisions, with the exception of small increases in Greenwood, New Westminster, Similkameen, Skeena, and Slocan, and fair-sized gains in Clinton and Liard.

Certificates of work, which also give a measure of the amount of exploration work currently being done, showed an increase from 88,954 in 1969 to 118,633 in 1970.

The number of free miners' certificates issued to individuals increased from 9,880 in 1969 to 10,034 in 1970, whereas to companies the number decreased from 1,060 in 1969 to 911 in 1970. This decrease in company activity reflects the increasing difficulty in 1970 of obtaining public financing for mine exploration.

Because of the greatly increased amount of exploration in the past few years, it has been impossible to obtain information and statistics useful to the industry except through the co-operation of the industry itself. Companies have been providing information by means of a questionnaire which is mailed annually to all mining exploration companies.

Properties where major exploration programmes were undertaken, namely, where more than 10,000 feet of diamond drilling and (or) percussion drilling or extensive underground work was done, are as follows (*see* body of report for details of work done):

Adera molybdenum property, near Atlin.
Eagle copper property on Yedhe (Eagle) Creek.
Liard Copper copper property on Schaft Creek.
SG copper-silver property, near Goosly Lake.
Bell, Black silver-copper-lead-zinc property, near Owen Lake.
Glacier Gulch molybdenum property on Hudson Bay Mountain.
Gibraltar, Pollyanna copper property at Granite Mountain.
Cariboo Bell copper property, near Likely.

Taseko copper property, near Taseko Lake.
Poison Mountain copper property at Poison Mountain.
Paramount copper-zinc-silver property at Buttle Lake.
Catface copper property, near Tofino.
Goof, Sue copper property on Harper Creek.
Maggie copper-molybdenum property on Bonaparte River.
Iron Mask copper property, near Kamloops.
Valley Copper copper property in Highland Valley.
Chataway copper property in Highland Valley.
Axe copper property on Summers Creek.
Greyhound copper mine, near Greenwood.
Annex silver-lead-zinc property at Remac.
Lexington copper property, near Greenwood.

Information provided to the Department regarding exploration work done in 1970 is summarized in the accompanying table. Of 556 properties listed, geological mapping was done on 258, geophysical surveys at 259, and geochemical surveys at 264. This work in many instances preceded surface work, which was done at 172, and drilling of one sort or another, which was done at 228. Underground work, excluding diamond drilling, was done at only 25 properties.

In 1970, exploratory diamond drilling was down somewhat in total footage from 1969 despite the fact that more properties were drilled. It comprised 576,805 feet of surface diamond drilling, 96,136 feet of underground diamond drilling, 2,400 feet of rotary drilling, and 235,833 feet of percussion drilling.

Mining Division	Number of Properties	Type of Work						Drilling			
		Geological Mapping	Geophysical Surveys	Geochemical Surveys	Line-cutting	Physical		Surface Diamond Drilling (Ft.)	Underground Diamond Drilling (Ft.)	Rotary (Ft.)	Percussion (Ft.)
						Surface	Underground				
Alberni	15	9	7	8	—	3	3	7,915	14,448	—	—
Atlin	17	10	4	10	—	5	1	18,340	—	—	—
Cariboo	31	12	19	17	—	8	—	86,976	1,174	900	18,625
Clinton	18	12	8	8	—	4	—	11,231	—	—	22,275
Fort Steele	13	6	2	7	—	2	1	5,698	—	—	—
Golden	10	4	7	4	—	6	—	2,207	—	—	—
Greenwood	22	16	12	15	—	4	1	21,415	—	—	19,022
Kamloops	79	34	36	29	—	17	2	167,075	22,813	1,500	44.327
Liard	43	24	13	16	—	20	5	71,018	14,503	—	21,342
Lillooet	13	5	3	5	—	8	—	2,496	—	—	—
Nanaimo	36	18	23	27	—	8	—	22,441	—	—	2,730
Nelson	7	4	3	3	—	2	1	4,866	8,659	—	5,543
New Westminster	11	5	3	6	—	5	1	5,492	—	—	—
Nicola	26	14	12	9	—	7	—	2,025	—	—	32,385
Omineca	121	39	64	65	—	38	2	114,179	24,740	—	14,206
Osoyoos	13	7	5	7	—	5	—	3,578	1,448	—	—
Revelstoke	3	2	—	—	—	2	—	4,477	—	—	128
Similkameen	22	11	13	9	—	4	—	5,103	6,500	—	52,695
Skeena	18	10	8	4	—	6	2	3,279	—	—	555
Slocan	14	3	2	2	—	8	4	4,671	—	—	—
Trail Creek	3	2	1	1	—	1	1	1,462	2,031	—	—
Vancouver	10	5	7	5	—	3	1	8,503	—	—	2,000
Vernon	3	1	2	2	—	3	—	1,883	—	—	—
Victoria	8	5	5	5	—	3	—	275	—	—	—
Totals	556	258	259	264	—	172	25	576,805	96,316	2,400	235,883

REPORTS ON METAL MINES

INTRODUCTION

Locations—In this Report the location of a property is described by latitude and longitude and also by the N.T.S. designation of the 1:50,000 map-sheet in which it lies. The location of a large and commonly irregular group of claims is given as a range of co-ordinates which outlines the rectangle which will encompass the group, it is not necessarily the area in which the work was done. The location of the centre of a small group of claims, or of a mineral deposit, is given as a single co-ordinate pair, the accuracy of which varies with the type of data from which the claims were plotted.

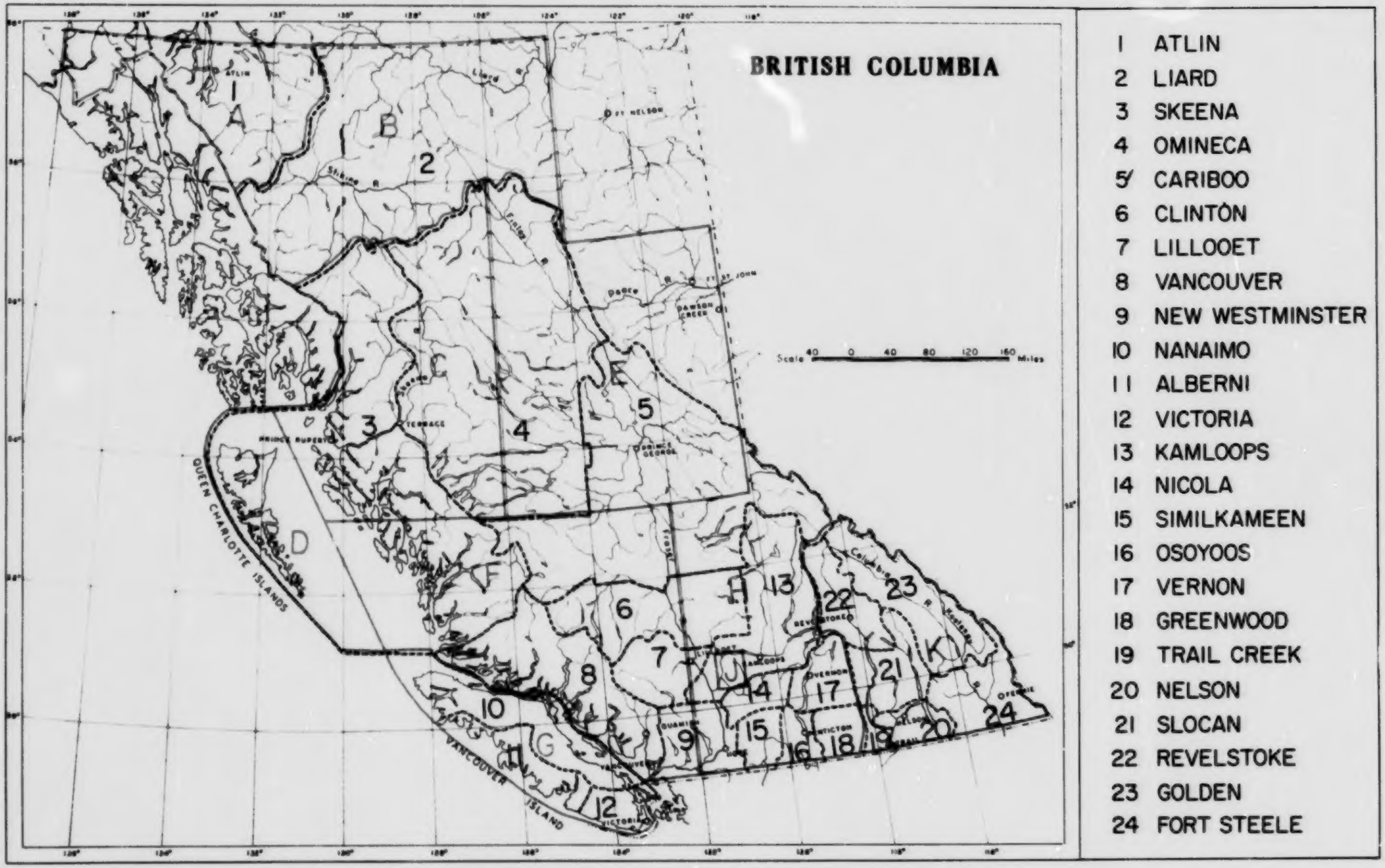
In the National Topographic System of mapping, the whole of Canada is divided into primary map quadrangles, each 4 degrees latitude by 8 degrees longitude and each described by a number (for example, 104). The primary quadrangle is subdivided into 16 map-sheets, each 1 degree latitude by 2 degrees longitude, and described by letters A to P (for example, 104G). Each lettered quadrangle is further subdivided into 16 map-sheets, each 15 minutes latitude by 30 minutes longitude and numbered 1 to 16 (for example, 104G/7). Finally, each sheet is halved east and west for maps of the 1:50,000 series and are described (for example, 104G/7E).

An index to published maps may be obtained by requesting Indexes 8 to 14 from the Department of Lands, Forests, and Water Resources, Victoria. Map No. 1JNT shows the N.T.S. map-sheets covering the Province.

Names—The name or names given to a property mainly are those of one or more of the claims that constitute the group. Occasionally a name is used by which the property originally or formerly had been known (for example, Glacier Gulch, Magnum), and occasionally a name is used which is derived from the name of the company owning the property (for example, Bralorne, Granisle). Where practicable, all names of claims comprising a property are given under the heading "Claims."

Sources of information—(1) The following section contains reports based on examinations made by staff geologists of mineral deposits and mineralized areas, some of which may be recent discoveries and most of which currently are under exploration. There are informative reports on the following properties or areas:

SNO, BIRD (Liard Copper), on Schaft Creek, *see* pages 49 to 57.
GRANDUC MINE, northwest of Stewart, *see* pages 66 to 73.
MAPLE BAY COPPER MINES, south of Stewart, *see* pages 77 to 81.
RED POINT, COPPER CLIFF, near Alice Arm, *see* pages 81 to 86.
ROUNDY CREEK, near Kitsault, *see* pages 91 to 94.
LEN, near Huckleberry Mountain, *see* pages 104 to 107.


BRITISH COLUMBIA
Scale 40 0 40 80 120 160 Miles
A
B
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J
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QUEEN CHARLOTTE ISLANDS
VANCOUVER ISLAND
Atlin
Liard R.
Ft. Nelson
Stikine R.
Fraser R.
Peace R.
Ft. St. John
Dawson Creek
Prince Rupert
Terrace
Prince George
Fraser
Columbia R.
Kootenay
Revelstoke
Vernon
Penticton
Nelson
Victoria
1 ATLIN
2 LIARD
3 SKEENA
4 OMINECA
5 CARIBOO
6 CLINTON
7 LILLOOET
8 VANCOUVER
9 NEW WESTMINSTER
10 NANAIMO
11 ALBERNI
12 VICTORIA
13 KAMLOOPS
14 NICOLA
15 SIMILKAMEEN
16 OSOYOOS
17 VERNON
18 GREENWOOD
19 TRAIL CREEK
20 NELSON
21 SLOCAN
22 REVELSTOKE
23 GOLDEN
24 FORT STEELE

Figure 1. Index map showing mining divisions and outlines (in red) of Figures A, B, C, D, E, F, G, H, J, K.

Geology of the Owen Lake, Parrott Lakes, and Goosly Lake area, south of Houston, *see* pages 119 to 125.

SG, south of Houston, *see* pages 126 to 128.

SILVER QUEEN (NADINA), east of Owen Lake, *see* pages 134 to 138.

FAR, south of Houston, *see* pages 141 to 149.

ZYM, near Terrace, *see* pages 189 to 193.

BD, VB, on Rayfield River, *see* pages 218 to 221.

BRITANNIA MINE, near Vancouver, *see* pages 233 to 246.

Rupert Inlet, Cape Scott area, northern Vancouver Island, *see* pages 254 to 258.

ISLAND COPPER, Rupert Arm, *see* pages 267 to 269.

BON, near Bonanza Lake, *see* pages 274 to 278.

GOOF, SUE, HAIL, on Harper Creek, *see* pages 297 to 301.

ANTICLIMAX, near Little Fort, *see* pages 304 to 307.

Geology of the Eakin Creek-Windy Mountain area, near Little Fort, *see* pages 307 to 312.

VALLEY COPPER, in Highland Valley, *see* pages 354 to 369.

Geology of the White Lake Basin, west of Kaleden, *see* pages 396 to 401.

LEXINGTON, near Greenwood, *see* pages 413 to 425.

(2) A considerable amount of information in the following report was supplied by exploration companies. Their co-operation in completing and returning exploration questionnaires for each of the properties on which they worked is gratefully acknowledged by the Department and should be greatly appreciated by all users of this Report.

(3) Geological, geophysical, and geochemical reports accepted by the Department for credit as assessment work contain a large amount of valuable information. The results of work presented in assessment reports that were accepted by January 15, 1971 are summarized and published. The last report summarized is Assessment Report 2832. These assessment reports are on file in the Mineralogical Branch, Department of Mines and Petroleum Resources, Room 418, Douglas Building, Victoria. Locations of the report areas are plotted on index maps and a numerical list and N.T.S. index of the reports is in press. This index supersedes the list that was published annually in the Annual Report.

Publications—In 1970, one bulletin was published by the Mineralogical Branch, Department of Mines and Petroleum Resources, that is Bulletin 57, *Jordan River Area,* by James T. Fyles. The bulletin describes the structure and lithology of rocks associated with conformable lead-zinc deposits in the Shuswap Metamorphic Complex northwest of Revelstoke. This type of deposit contains large reserves of lead and zinc, but none of the deposits has been mined.

Additional reports and articles published in 1970 by officers of the Mineralogical Branch, resulting directly from their work as staff geologists, include the following:

CARTER, N. C. Copper and Molybdenum Deposits in Central British Columbia, *Can. Min. Jour.*, Vol. 91, No. 4, pp. 74–76.

Fyles, James T. Geological Setting of the Lead-Zinc Deposits in the Kootenay Lake and Salmo Areas of British Columbia, *Washington Div. of Mines and Geology*, Bull. 61, pp. 41–53.

——— Structure of the Shuswap Metamorphic Complex in the Jordan River area, northwest of Revelstoke, British Columbia, *Geol. Assoc. Canada*, Spec. Paper No. 6, pp. 87–98.

Fyles, James T.; Weissenborn, A. E.; and Armstrong, Frank Introduction to "Lead-Zinc Deposits in the Kootenay Arc, Northeastern Washington and Adjacent British Columbia," *Washington Div. of Mines and Geology*, Bull. 61, pp. 3, 4.

Hedley, M. S. Big Gain in British Columbia, *Western Miner*, Vol. 43, No. 4, pp. 87–91.

Preto, V. A. G. Amphibolites from the Grand Forks Quadrangle of British Columbia, Canada, Abstract, *Geol. Soc., Amer.*, Bull., Vol. 81, pp. 763–782.

——— Structure and Petrology of the Grand Forks Group, British Columbia, *Geol. Surv., Canada*, Paper 69–22.

The following preliminary geological maps were released in 1970:

No. 2—Geology of the McCarren Creek, Goosmus Creek Area, by B. N. Church (part of 82E/2E).

No. 4—Geological Map of the Rossland Area, by James T. Fyles (three sheets) (part of 82F/4W).

No. 5—Geology of the White Lake Basin, by B. N. Church (part of 82E/5).

The following preliminary mineral inventory maps were released in 1970:

Sheet Designation		Scale	Content	Number of Properties
82E/SE (MI)	Grand Forks	1 inch to 2 miles	Property name and number	131
82F/SW (MI)	Trail	1 inch to 2 miles	Property name and number	225
82K/NW (MI)	Beaton	1 inch to 2 miles	Property name and number	85
82K/SW (MI)	Nakusp	1 inch to 2 miles	Property name, number, and commodity	56
82M (MI)	Seymour Arm	1:250,000	Property name, number, and commodity	103
82N (MI)	Golden	1:250,000	Property name, number, and commodity	27
92F(MI)	Alberni	1:250,000	Property name and number	270
92J (MI)	Pemberton	1:250,000	Property name, number, and commodity	80
92O (MI)	Taseko Lakes	1:250,000	Property name, number, and commodity	59
92P (MI)	Bonaparte River	1:250,000	Property name, number, and commodity	100
93B (MI)	Quesnel	1:250,000	Property name, number, and commodity	14
93F (MI)	Nechako River	1:250,000	Property name, number, and commodity	28
93K (MI)	Fort Fraser	1:250,000	Property name, number, and commodity	56
93L (MI)	Smithers	1:250,000	Property name, number, and commodity	162
93M (MI)	Hazelton	1:250,000	Property name, number, and commodity	111
93N (MI)	Manson River	1:250,000	Property name, number, and commodity	73
103I (MI)	Prince Rupert-Terrace	1:250,000	Property name, number, and commodity	107
103P (MI)	Nass River	1:250,000	Property name, number, and commodity	232

Most of the mineral inventory maps are known to be incomplete. They are continually being amended, but it is expected that final maps will not be available for several years.

White prints of the preliminary geological and mineral inventory maps are available for $1 per sheet on application to the Chief, Mineralogical Branch, Department of Mines and Petroleum Resources.

Thirty aeromagnetic maps were released in 1970 that resulted from the joint Federal-Provincial Government-financed programme of aeromagnetic surveying. There were 16 maps located in N.T.S. sheet 93M, 6 in 93N, and 8 in 94D.

Details of the maps released and purchase orders should be addressed to the Department of Mines and Petroleum Resources, Room 411, Douglas Building, Victoria.

ATLIN MINING DIVISION

HAINES ROAD

KELSAL (No. 1, Fig. A)

LOCATION: Lat. 59°46.5–48.5′ Long. 136°27.5–32′ (114P/15E, 16W)
On the south side of Kelsall Lake.
CLAIMS: KELSAL 1 to 32.
ACCESS: Three miles east of Glacier camp (Mile 75) on the Haines road.
OPERATOR: PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2.
METAL: Copper.
DESCRIPTION: Meta-andesite contains quartz veinlets mineralized with pyrite and chalcopyrite.
REFERENCES: Assessment Reports 2570, 2829.

BORNITE, CAT (No. 2, Fig. A)

LOCATION: Lat. 59°34.6′ Long. 136°35.7′ (114P/10E)
At approximately 4,000 feet elevation in the Rainy Hollow area.
CLAIMS: BORNITE, CAT, totalling 90.
ACCESS: By road from Whitehorse, Y.T., 205 miles.
OWNER: PANTHER MINES LTD., 333, 885 Dunsmuir Street, Vancouver 1.
METALS: Copper, lead, zinc.
DESCRIPTION: Skarn zones in Palæozoic sedimentary rocks are mineralized by (1) bornite, chalcocite, and chalcopyrite; (2) galena and sphalerite; and (3) pyrrhotite, pyrite, sphalerite, and chalcopyrite.
WORK DONE: Trenching on Bornite 1 to 4.
REFERENCE: Assessment Report 2357.

BENNETT LAKE

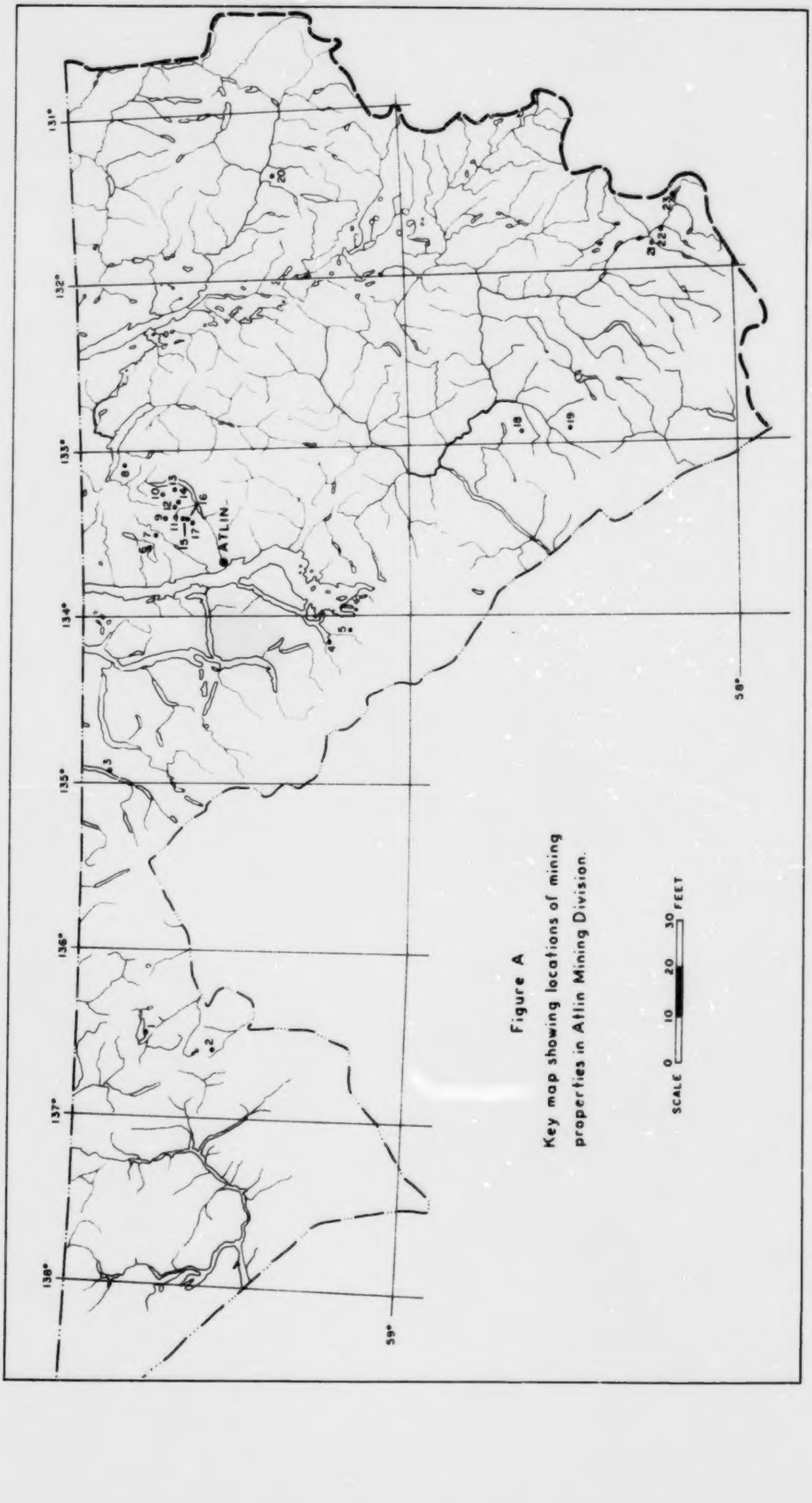
DICK, OLD (SILVER QUEEN) (No. 3, Fig. A)

LOCATION: Lat. 59°54–56.5′ Long. 134°23–27′ (104M/16W)
Between 2,500 and 4,500 feet elevation on east shore of Bennett Lake, near Pavey.
CLAIMS: DICK 1 to 40, OLD 1 to 6.
ACCESS: By rail from Carcross, Y.T., 30 miles.
OWNER: PREMIER MINING CORPORATION LTD., 818, 510 West Hastings Street, Vancouver 2.
METAL: Silver.
WORK DONE: Aeromagnetic survey, 64 line-miles covering all claims.
REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1915, p. 64; 1916, p. 46; 1933, p. 73; Assessment Report 2681.

WILLISON BAY

MOLLY (No. 4, Fig. A)

LOCATION: Lat. 59°14.4–15.2′ Long. 134°08–12′ (104M/1E)
At approximately 3,500 feet elevation on south side of Willison Bay, west of Hoboe Creek.
CLAIMS: MOLLY, FAYE, totalling 54.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132°
133°
134°
135°
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ATLIN
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SCALE 0 10 20 30 FEET

Figure A

Key map showing locations of mining properties in Atlin Mining Division.

KEY TO PROPERTIES ON INDEX MAP, FIGURE A

1 KELSAL, page 23.
2 BORNITE, CAT, page 23.
3 DICK, OLD (SILVER QUEEN), page 23.
4 MOLLY, page 23.
5 MUSSEN, page 26.
6 SUN, page 26.
7 BIG HILL, STEEP HILL, page 26.
8 PIP, DIP, SIP, page 27.
9 GOODLIFE, LUCK, page 27.
10 PIT, PAL, page 28.
11 ADERA, page 28.
12 CLAIRE, page 29.
13 SNAFU, TARFU, page 29.
14 HUB, PUB, page 29.
15 HOBO, AT, X, page 29.
16 GARNET, page 30.
17 BUB, page 30.
18 MAD, NUT, page 30.
19 BS-J, page 31.
20 SWAN, page 31.
21 KID, GRIZZLY, page 31.
22 GO, G, page 32.
23 PAT, page 32.

ACCESS: By air or boat from Atlin, 30 miles.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

METALS: Molybdenum, copper.

DESCRIPTION: Molybdenite and chalcopyrite are associated with a late alaskite intrusion; the mineralization is disseminated in felsic igneous rocks and concentrated in quartz veins, felsic dykes, shear zones, and breccia zones.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet; geochemical silt survey, 147 samples covering all claims.

REFERENCE: Assessment Report 2755.

MUSSEN (No. 5, Fig. A)

LOCATION: Lat. 59°10.5–12' Long. 134°04–06' (104M/1E)
Southwest slope of Mount Mussen on Hoboe Creek, 4 miles south of Willison Bay, 35 miles southwest of Atlin.

CLAIMS: MUSSEN 1 to 32.

ACCESS: By helicopter from Atlin, 35 miles.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Chalcopyrite occurs in quartz veins cutting amphibolite gneiss and chlorite schist.

WORK DONE: Surface geological mapping, 1 inch equals 1,500 feet, covering all claims.

ATLIN

SUN (No. 6, Fig. A)

LOCATION: Lat. 59°47.5' Long. 133°35' (104N/13E)
On the south slope of Mount McIntosh.

CLAIMS: SUN 1 to 6.

ACCESS: By float plane to a small lake close to Mount McIntosh, or by four-wheel-drive vehicle from Atlin via the Fourth of July road.

OWNER: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

METAL: Molybdenum.

DESCRIPTION: Molybdenite occurs disseminated and in quartz veinlets in a northeasterly trending altered mylonite zone in quartz monzonite on the Sun 6 claim.

WORK DONE: Geological mapping of the claims in 1969 was followed by a geochemical survey in 1970. One hundred and forty-eight soil samples were taken systematically and analysed for copper, molybdenum, and lead.

REFERENCES: Assessment Reports 2485, 2486.

BIG HILL, STEEP HILL (No. 7, Fig. A)

LOCATION: Lat. 59°46.5' Long. 133°30.5' (104N/13E)
At approximately 5,000 feet elevation on the west side of Fourth of July Creek, 16 miles northeast of Atlin.

CLAIMS: BIG HILL 1 to 10, STEEP HILL 1 to 4, 10, 11.

ACCESS: By Fourth of July Creek road from Atlin, 18 miles.

OWNER: BUFFALO LAKE MINES LTD., 720 West Hastings Street, Vancouver 1.

METAL: Molybdenum.

DESCRIPTION: Alaskite contains quartz veinlets mineralized with molybdenite and pyrite occupying joint sets of three different orientations.

Work done: Surface workings mapped; surface geological mapping, 1 inch equals 1,500 feet on all claims; geochemical soil survey, approximately 100 samples covering all claims; trenching, 100 feet on Big Hill 7 to 10 and Steep Hill 2, 4, 10, and 11.

Reference: Assessment Report 2809.

PIP, DIP, SIP (No. 8, Fig. A)

Location: Lat. 59°51–54′ Long. 133°00–10′ (104N/14E) Between 4,000 and 5,000 feet elevation, 30 air-miles northeast of Atlin; claims adjoin the south side of the west end of Gladys Lake between Davenport and Chehalis Creeks.

Claims: PIP 1 to 10, DIP 1 to 10, SIP 1 to 32, 35 to 40, DELL 1 to 54, JOY 1 to 112, 125 to 132.

Access: By road from Atlin, 41 miles.

Operator: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

Metal: Molybdenum.

Description: Minor amounts of molybdenite occur in quartz veins in a stockwork zone centred about an alaskite ring-dyke complex emplaced into sedimentary rocks of the Cache Creek Group. Alteration consists of bleaching, silicification, and sericitization. Pyrite and minor amounts of chalcopyrite and pyrrhotite largely occur peripheral to the stockwork zone.

Work done: Surface geological mapping, 1 inch equals 1,000 feet on Sip 25 to 32, 35 to 40, Dell 1 to 4, 19 to 54, and Joy 1 to 46, 59 to 112, 125 to 132 and geochemical silt, water, and soil survey, 940 samples covering same claims; surface geological mapping 1 inch equals 400 feet on Pip 1 to 10, Dip 1 to 10, Sip 1 to 24, Joy 47 to 58, and Dell 5 to 18 and geochemical silt, water, and soil survey, 503 samples covering same claims; road construction, 5 miles on central portion of property; trenching, 5,600 feet on Dip 3, Pip 1, 3 to 6, and Sip 15 to 18, 20.

Reference: Assessment Report 2653.

GOODLIFE, LUCK (No. 9, Fig. A)

Location: Lat. 59°44.5′ Long. 133°25′ (104N/11W) At approximately 5,000 feet elevation at the head of Volcanic Creek, 15 miles northeast of Atlin.

Claims: GOODLIFE 1 to 8, 15 to 30, LUCK 1 to 48.

Access: By road from Atlin, 20 miles up Fourth of July Creek, thence 2 miles by foot.

Owner: Canyon City Explorations Ltd.

Operator: NEWMONT MINING CORPORATION OF CANADA LIMITED, 604, 744 West Hastings Street, Vancouver 1.

Metals: Molybdenum, copper.

Description: Coarse rosettes of molybdenite occur in narrow quartz veins and on fracture planes in a 100 to 200-foot wide north-trending zone in weakly jointed hornblende diorite.

Work done: Surface geological mapping, 1 inch equals 500 feet, covering all claims.

References: Assessment Reports 2346, 2446, 2519.

PIT, PAL (No. 10, Fig. A)

LOCATION: Lat. 59°44.7′ Long. 133°16.8′ (104N/11W)
On the north side of Cracker Creek, 2 miles west of its mouth.

CLAIMS: PIT 1 to 32, PAL 1 to 4.

ACCESS: Two miles east of the Adanac camp, or via Surprise Lake, and 2 miles up Cracker Creek.

OWNER: P. LUCIER, Whitehorse, Y.T.

METALS: Copper, molybdenum.

DESCRIPTION: A 5-foot quartz vein contains malachite and azurite.

WORK DONE: The claims were prospected, some pits were blasted on the Pit 19 claim; and a few bedrock samples were taken for geochemical analysis.

REFERENCE: Assessment Report 2725.

ADERA (No. 11, Fig. A)

By B. M. Dudas

LOCATION: Lat. 59°42.5′ Long. 133°24′ (104N/11W)
On upper Ruby Creek, some 21 miles by road from Atlin.

CLAIMS: The Adera group of 12 mineral claims covers the main showings, also KEY 1 to 44; RU 1 to 8; PACIFIC 1, 2; NI 1 to 4.

ACCESS: Twenty-one miles by road from Atlin via Pine Creek, Surprise Lake, and Ruby Creek to a multitrailer camp constructed by Kerr Addison Mines Ltd.

OWNER: Adanac Mining and Exploration Ltd. (The property was optioned to Kerr Addison Mines Ltd. early in 1970.)

OPERATOR: KERR ADDISON MINES LTD., Adanac Project, 1050 Davie Street, Vancouver 5.

METALS: Molybdenum, tungsten.

WORK DONE:

Kerr Addison built a new camp below the showings and started an extensive development programme. Studies were directed toward ecological effects, plant design and location, tailings disposal, power, water, main access, transportation, and townsite.

Lateral underground work done during the year included an adit and crosscuts having a total length of 2,743 feet. Nine hundred and twenty-one feet of raising was completed as well. Material from the development work was sampled and stockpiled.

In July a 100-tons-per-day pilot mill was erected and about 9,000 tons of stockpiled material was treated before the plant closed for the winter on December 9. The connected electrical load was as follows:

	Horsepower
Grinding	50
Concentrating	35
Conveyors	10
Pumps	35
Mine fan	30
Total	160

Active surface exploration, geological mapping, and diamond drilling were carried out. A total of 18,340 feet of surface diamond drilling was completed.

The total number of men employed on the property during the peak of the season was 96.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 29–35.

CLAIRE (No. 12, Fig. A)

Location: Lat. 59°42.8′ Long. 133°21′ (104N/11W)
On the east side of Ruby Creek, 16 miles northeast of Atlin.

Claims: CLAIRE 1 to 4 Fractions.

Access: By road from Atlin and up Ruby Creek.

Owner: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

Description: No mineralized material is known to outcrop.

Work done: A geochemical survey of the claims was made, 68 soil samples were collected and analysed for 10 elements.

Reference: Assessment Report 2576.

SNAFU, TARFU (No. 13, Fig. A)

Location: Lat. 59°40–44′ Long. 133°12–18′ (104N/11W, 11E)
On the west side of Surprise Lake, east of Ruby Creek and south of Cracker Creek.

Claims: SNAFU 1 to 66, TARFU 1 to 20, MINTO 1 to 18, SALLY 1 to 4.

Access: By road to Ruby Creek, thence eastward by tractor road.

Operator: ADANAC MINING AND EXPLORATION LTD., 908, 1111 West Hastings Street, Vancouver 1.

Work done: Silt samples were taken at 500-foot intervals along Cracker Creek and various other small unnamed creeks crossing the property; 167 samples were collected and analysed for copper, molybdenum, and tungsten.

Reference: Assessment Report 2710.

HUB, PUB (No. 14, Fig. A)

Location: Lat. 59°42.3′ Long. 133°19.2′ (104N/11W)
Between Ruby and Cracker Creeks, 3 miles north of Surprise Lake.

Claims: HUB 1 to 8, PUB 1 to 16.

Access: By road from Atlin 16 miles to Ruby Creek, thence by four-wheel-drive vehicle over 1 mile of poor road.

Operator: PANTHER MINES LTD., 333, 885 Dunsmuir Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Float containing molybdenite and chalcopyrite and pyrrhotite was found but no mineralization in place is known.

Work done: The claims were mapped geologically at 1 inch equals 200 feet. A geochemical survey of the claims was made; 55 soil samples were taken and analysed for copper and molybdenum. Some trenching was done on the Hub 1 to 8.

Reference: Assessment Report 2541.

HOBO, AT, X (No. 15, Fig. A)

Location: Lat. 59°41.6′ Long. 133°41.6′ (104N/11W)
At the head of Boulder Creek.

Claims: HOBO 91, 93 to 96; AT 7, 8, 10 to 18; X 1 to 8, 13 to 18.

Access: By road from Atlin 12 miles.

Owner: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

Metal: Tungsten.

Description: In an area where bedrock is largely covered by overburden, quartz veins mineralized with wolframite outcrop.

Work done: Surface geological mapping, 1 inch equals 200 feet on the X claims; geochemical soil survey, 189 samples covering the X claims analysed for molybdenum, copper, lead, silver, tin, and tungsten.

Reference: Assessment Report 2852.

GARNET (No. 16, Fig. A)

Location: Lat. 59°40.5′ Long. 133°25.5′ (104N/11W)
On the west side of Boulder Creek, 2½ miles upstream from its mouth.

Claims: GARNET 1 to 4.

Access: By road from Atlin to Boulder Creek.

Owner: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

Metals: Tungsten, molybdenum.

Description: Numerous quartz veins in alaskite, quartzite, and limestone are mineralized with wolframite, molybdenite, and galena.

Work done: A geological survey of the claims was made. Thirty-six soil samples were collected from exploration trenches and analysed for 10 elements (including tin, tungsten, molybdenum, copper, and silver).

References: Assessment Reports 2461, 2462.

BUB (No. 17, Fig. A)

Location: Lat. 59°39.5′ Long. 133°26′ (104N/11W)
On the west side of Boulder Creek extending northward from 1 mile above the mouth of the creek.

Claims: BUB 1 to 24.

Access: Fourteen miles by road from Atlin.

Owner: COIN CANYON MINES LTD., 508, 850 West Hastings Street, Vancouver 1.

Metals: Tungsten, tin.

Description: Disseminations and irregular lenses of pyrrhotite and pyrite, with minor amounts of chalcopyrite, tetrahedrite, galena, sphalerite, cassiterite, and scheelite occur in talcose basic volcanics and peridotite. Minor molybdenite mineralization is exposed in a trench on the Bub 15 claim.

Work done: A geological survey of the claim was made and 176 soil samples were collected and analysed for copper, molybdenum, lead, and silver. Later, 403 fill-in soil samples were taken and analysed for copper.

Reference: Assessment Report 2672.

SUTLAHINE RIVER

MAD, NUT (No. 18, Fig. A)

Location: Lat. 58°38–40′ Long. 132°54–58′ (104K/10W)
Between 3,000 and 6,084 feet elevation, 4 miles south of King Salmon Lake, 22 miles east of Tulsequah.

Claims: MAD 1 to 16, 19, 20, 32, 34 to 50; NUT 1, 2.

Access: From Juneau, Alaska, by float-equipped aircraft to King Salmon Lake, thence by helicopter to property.

Owner: TAKU SYNDICATE, c/o L. G. White, 202, 850 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Geochemical copper anomalies and a magnetometer survey led to the discovery of minor chalcopyrite mineralization.

Work done: Magnetometer survey, 40 line-miles covering all claims.

Reference: Assessment Report 2537.

BS-J (No. 19, Fig. A)

Location: Lat. 58°30.1′ Long. 132°55′ (104K/10W)
Between 4,200 and 7,300 feet elevation, 24 miles east-southeast of Tulsequah, approximately 14 miles south of King Salmon Lake.

Claims: BS-J, totalling 99.

Access: From Juneau, Alaska, by float plane to Tatsamenie Lake, thence by helicopter to property.

Owner: TAKU SYNDICATE, c/o L. G. White, 202, 850 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Chalcopyrite and minor molybdenite are associated with northeasterly trending faults and joint systems in a quartz-monzonite pluton.

Work done: Surface geological mapping, 1 inch equals 1,000 feet on all claims; magnetometer survey, 18 line-miles covering 79 claims; geochemical stream sediment survey, 1,400 samples covering all claims; trenching, 127 feet on BS-J 44 and 250 feet on BS-J 37.

References: Assessment Reports 2648, 2649.

JENNINGS RIVER

SWAN (No. 20, Fig. A)

Location: Lat. 59°20–24′ Long. 131°22–25′ (104O/6W)
Between 3,000 and 5,000 feet elevation on the south side of Jennings River, 7 miles northeast of Kedahda Lake.

Claims: SWAN 1 to 80.

Access: From Dease Lake by helicopter, 75 miles.

Owner: UNION MINIERE EXPLORATIONS AND MINING CORPORATION LIMITED, Suite 4105, One Place Ville Marie, Montreal, P.Q.

Metal: Molybdenum.

Work done: Surface workings mapped (reconnaissance only); geochemical soil survey, 585 samples covering Swan 30, 32, 37, 39, 41, 43 to 48, 50, 52, and 65 to 72.

Reference: *B.C. Dept. of Mines,* Bull. 19.

SHESLAY RIVER

KID, GRIZZLY (No. 21, Fig. A)

Location: Lat. 58°14.7′ Long. 131°52.8′ (104J/4W)
On the west side of Sheslay River, 2½ miles above junction of the Hackett River.

Claims: KID, GRIZZLY 1 to 20.

ACCESS: Thirty-five miles by helicopter northwest of Telegraph Creek.

OPERATOR: COLORADO CORPORATION, 200 Brooks Towers Building, Denver 80202, Colo.

METAL: Copper.

DESCRIPTION: Chalcopyrite is disseminated in syenitic to monzonitic intrusions and in east-trending shears in adjacent volcanic rocks.

WORK DONE: A programme of prospecting, line-cutting, soil sampling, geological mapping, hand-trenching, and bulk sampling was undertaken in 1970.

REFERENCE: Assessment Report 2605.

GO, G (No. 22, Fig. A)

LOCATION: Lat. 58°15' Long. 131°47' (104J/4W)
On the east slope of Kaketsa Mountain at elevation 2,500 to 5,000 feet.

CLAIMS: GO 57 to 62, 89 to 96, 103 to 108; G 5 to 10.

ACCESS: By helicopter, 30 miles northwest of Telegraph Creek.

OWNER: Skyline Explorations Ltd.

OPERATOR: COLORADO CORPORATION, 200 Brooks Towers Building, Denver 80202, Colo.

METAL: Copper.

DESCRIPTION: Andesitic volcanics are intruded by irregularly shaped monzonite-syenite plutons. Highly altered contact zones are mineralized with magnetite and chalcopyrite along northwesterly trending shear zones.

WORK DONE: Three hundred and nineteen soil samples were taken and analysed for copper, lead, and zinc.

REFERENCE: Assessment Report 2805.

PAT (No. 23, Fig. A)

LOCATION: Lat. 58°11.2' Long. 131°35' (104J/4E)
On the north side of Hatchau Lake.

CLAIMS: PAT 1 to 12, 17 to 30.

ACCESS: Twenty-five miles by helicopter or float plane from Telegraph Creek.

OPERATOR: COLORADO CORPORATION, 200 Brooks Towers Building, Denver 80202, Colo.

METALS: Copper, gold, silver.

DESCRIPTION: Chalcopyrite, with pyrite and pyrrhotite, is disseminated and in irregular veinlets in altered volcanics.

WORK DONE: During 1969 and 1970, 432 soil samples were collected from the claims and analysed for copper, lead, zinc, silver, and molybdenum.

REFERENCES: Assessment Reports 2061, 2554.

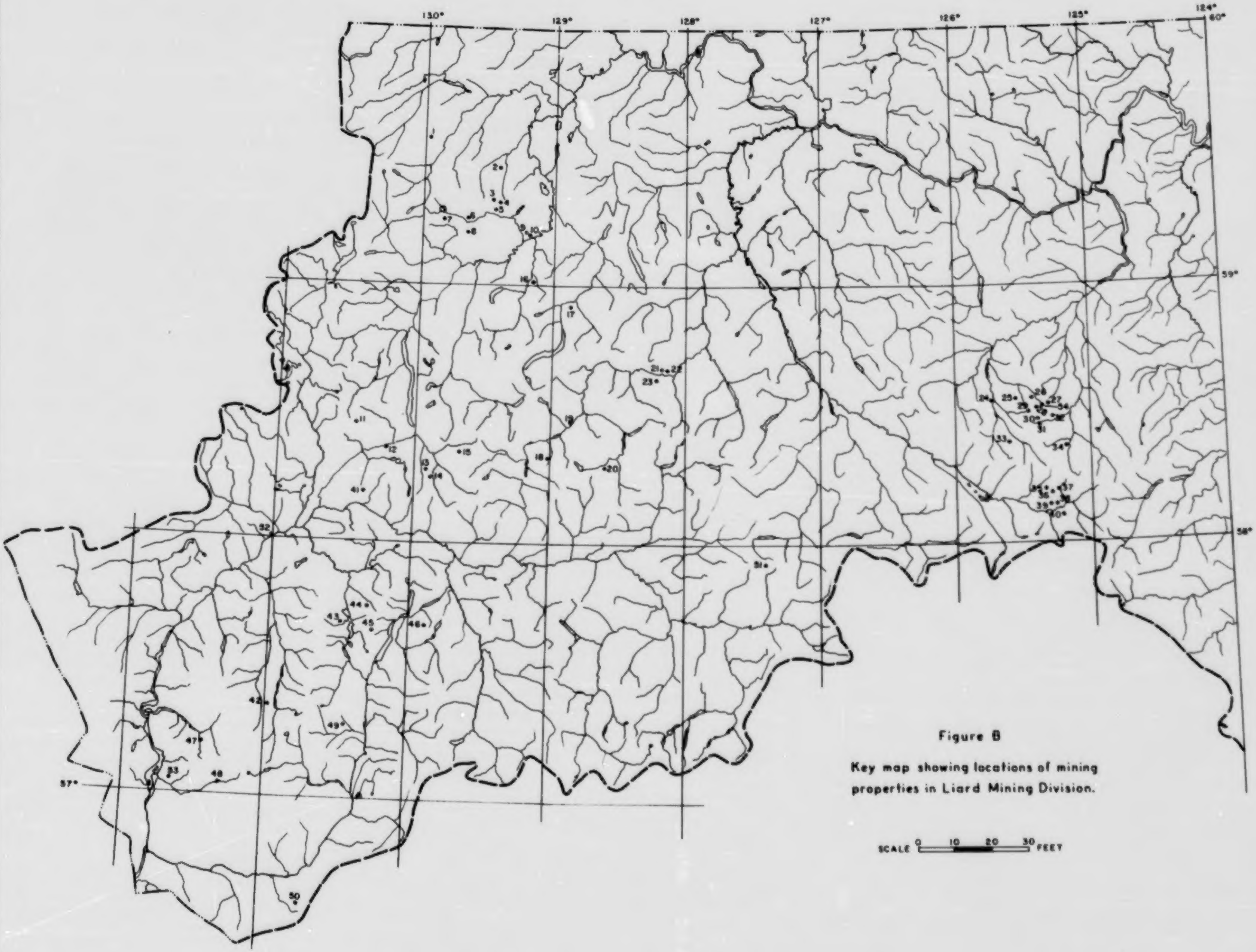
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Figure B

Key map showing locations of mining properties in Liard Mining Division.

KEY TO PROPERTIES ON INDEX MAP, FIGURE B

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47 CW, page 60.
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49 GREG, page 61.
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LIARD MINING DIVISION

CASSIAR

ICE LAKE, FH, HEAZLEWOOD (No. 1, Fig. B)

LOCATION: Lat. 59°34′ Long. 129°58′ (104P/12W)
Between 3,500 and 5,000 feet elevation at the head of Blue River, 20 miles northwest of Cassiar.

CLAIMS: ICE LAKE 1 to 4, FH 1 to 14, HEAZLEWOOD 1 to 8, PC 1 to 6, JUNE 1 to 6, AS 1 to 8, RW 1 to 10.

ACCESS: From Watson Lake, Y.T., by road, 57 miles.

OWNER: Univex Mining Corporation Ltd.

OPERATOR: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

METAL: Nickel.

DESCRIPTION: Awaruite occurs in serpentinized dunite and peridotite.

WORK DONE: Reconnaissance surface geological mapping.

REFERENCE: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 34.

ROSE (No. 2, Fig. B)

LOCATION: Lat. 59°27–30′ Long. 129°24–28′ (104P/6W)
At approximately 5,000 feet elevation on the west side of Spring Creek, between French River and Rosella Creek.

CLAIMS: ROSE, totalling 64.

ACCESS: By road and helicopter from Watson Lake, Y.T., 50 miles.

OWNER: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.

DESCRIPTION: Geochemical analyses of silts outlined an anomalous area of high lead and zinc content which is confirmed by rock chip geochemistry. No mineralization has been discovered. The area is underlain by Atan Group quartzite and limestone.

WORK DONE: Two hundred samples were collected for rock chip geochemistry.

REFERENCE: Assessment Report 2399.

JOEM, RAIN, DAKO (No. 3, Fig. B)

LOCATION: Lat. 59°20′ Long. 129°28.5′ (104P/6W)
At 5,200 feet elevation, 1 mile southeast from the summit of Mount Haskin.

CLAIMS: JOEM, RAIN, DAKO, etc.

ACCESS: By road from Watson Lake, Y.T., 85 miles.

OWNER: DELLA MINES LTD., 1307, 1030 West Georgia Street, Vancouver 5.

METALS: Copper, silver, zinc.

DESCRIPTION: Skarn with pyrrhotite, sphalerite, and chalcopyrite mineralization replaces limestone.

WORK DONE: Claims, topography, and surface workings mapped; surface geological mapping, 1 inch equals 100 feet on Joem 1 and 2; geochemical survey, 265 samples covering Kao 4 to 15; road construction, 3 miles; surface diamond drilling, seven holes totalling 3,211 feet on Joem 1 and 2, Dako 8.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 41.

LUNA (No. 4, Fig. B)

LOCATION: Lat. 59°19.5′ Long. 129°26′ (104P/6W)
Between 4,500 and 6,000 feet elevation at the head of Pass Creek, 2 miles east of Mount Haskin.

CLAIMS: LUNA 1 to 6, 9, 10.

ACCESS: By road and trail from the Cassiar road, approximately 3 miles.

OWNER: Bartle Explorations Ltd.

OPERATORS: BRETTLAND MINES LTD. and GLEN COPPER MINES LIMITED, c/o 1403, 1030 West Georgia Street, Vancouver 5.

METALS: Silver, lead, zinc.

WORK DONE: Hand-trenching, 153 feet in four open pits on the Luna 2, 9, and 10.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 42.

DOME (No. 5, Fig. B)

LOCATION: Lat. 59°14.5′ Long. 129°24.4′ (104P/6W)
At approximately 4,500 feet elevation, 10 miles east of Cassiar.

CLAIMS: DOME, BRETT, IRON CAP, totalling 100.

ACCESS: Three miles by road from the Cassiar road.

OPERATORS: BRETTLAND MINES LTD. and GLEN COPPER MINES LIMITED, 1009, 789 West Pender Street, Vancouver 1, and PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2 (joint venture).

METALS: Molybdenum, tungsten.

DESCRIPTION: Skarn occurring along the northeast side of a northwesterly trending porphyritic intrusion is mineralized with scheelite and molybdenite.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on Dome 1 to 12, 64, and 65, Iron Cap 8, and Brett 7, 9, and 11; ground magnetometer survey, 20 line-miles covering Dome 64 and 65 and Iron Cap 7 and 8; road construction, 3 miles from Cassiar road to property; trenching, approximately 1,000 feet on Dome 6, 7, 11, and 55; surface diamond drilling, five holes totalling 2,600 feet on Dome 9 and 10 and nine holes totalling 1,500 feet on Dome 5, 6, and 55.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 42.

SNOW CREEK GOLD MINE (No. 6, Fig. B)

By A. D. Tidsbury

LOCATION: Lat. 59°15.7′ Long. 129°39′ (104P/5E)
On Snowy Creek, 1½ miles upstream from its junction with McDame Creek, about 9 miles east of Cassiar.

CLAIMS: LEGGS 1 to 4; IONA 1, 2; AU 1 to 18; RRL 1 to 4 Fractions.

ACCESS: By 4 miles of road leaving the Cassiar highway to the east some 2 miles below Wing Canyon.

OWNER: Snow Creek Gold Mines Ltd.

OPERATOR: HOUG DEVELOPMENT LTD., 10351—60th Avenue, Edmonton, Alta.

METAL: Gold.

DESCRIPTION: Some spectacular visible gold with pyrite occurs in a system of quartz veins which are exposed in greenstone bluffs on the Leggs 1 claim on the north side of Snowy Creek.

WORK DONE: A nominal 200-tons-per day crusher complex and splitter system to reduce feed to 20 to 1 for bulk sampling tests, together with diesel-generated power facilities, an assay office, and a camp and cookery, were constructed and (or) refurbished. A 7 by 8-foot adit was driven 600 feet on the Leggs 1 claim to intersect the vein system. Four miles of road was rebuilt from the highway to the camp on the Leggs 4 claim, and about one-half mile of new road was constructed from the camp to the adit.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1935, p. B16; *Geol. Surv., Canada,* Mem. 319, pp. 117, 118.

SILVER QUEEN (MAGNO) (No. 7, Fig. B)

By A. D. Tidsbury

LOCATION: Lat. 59°15.5′ Long. 129°49.6′ (104P/5W)
Near the headwaters of Marble Creek, 3 miles south of Cassiar.

CLAIMS: MAGNO 1 to 4; MAGNO Fraction; CREST 1, 2. In addition, approximately 152 adjoining claims are being negotiated for with the owners.

ACCESS: By approximately 4 miles of road up Marble Creek from the Cassiar road at the south limit of Cassiar.

OWNER: COAST SILVER MINES LTD., c/o Grant Stewart Construction Ltd., Box 128, Cassiar.

METALS: Lead, zinc, silver.

DESCRIPTION: Quartz veins containing galena, sphalerite, pyrite, and magnetite occur in shear zones associated with dykes in schists, argillite, and limestone at and near the contact of a large pluton. The magnetite content permits use of a magnetometer for exploration, though economic values are not necessarily associated with the magnetite.

WORK DONE: Results from work conducted during the previous year were evaluated. In December, a camp was built in Grant Stewart's yard in Cassiar and the road ploughed preparatory to beginning underground exploration. The crosscut was collared and advanced to the vein intersection prior to shut-down for the Christmas holiday. Work is expected to resume in 1971.

REFERENCES: *Geol. Surv., Canada,* Mem. 319, p. 120; *Minister of Mines, B.C.,* Ann. Repts., 1955, p. 10; 1967, pp. 26, 27; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 41; Assessment Reports 1962, 1990.

VOLLAUG (HURRICANE, RED HILL) (No. 8, Fig. B)

LOCATION: Lat. 59°12.5′ Long. 129°39′ (104P/4E)
At elevation 5,000 to 6,000 feet on Table Mountain, 2 miles south of McDame Lake.

CLAIMS: HURRICANE 1 to 4; RED HILL 1 to 6; ADIT 1, 2; EAST Fraction and WEST Fraction Crown-granted claims; JENNIE EXTENSION 1 to 4 located claims.

ACCESS: By Cassiar road from Watson Lake, 80 miles.

OWNER: Table Mountain Mines Limited.

OPERATOR: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

METAL: Gold.

DESCRIPTION: A quartz vein cutting argillites, quartzites, and limestones and dipping approximately 30 degrees to the north has been traced on surface for several thousand feet.

WORK DONE: Surface workings mapped; bulldozer trenching, 3,200 feet on Hurricane 3 (Lot 6529), Hurricane 4 (Lot 6530), and Red Hill 2 (Lot 6532); bedrock trenching, 200 feet on Hurricane 3.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts. 1937, p. B24; 1962, p. 6.

BILL (No. 9, Fig. B)

Location: Lat. 59°12′ Long. 129°13′ (104P/3E)
One and one-half miles north of McDame.

Claims: BILL 1 to 6.

Access: The road from the Cassiar mine road to McDame goes through the northwest corner of the claims.

Owner: DRESSER INDUSTRIES, INC., 415 Third Street SW., Calgary 1, Alta.

Work done: A geochemical survey of the claims was made and 141 soil samples were analysed for copper, lead, and zinc.

References: Assessment Reports 1220, 2592.

ATAN (No. 10, Fig. B)

Location: Lat. 59°12′ Long. 129°12′ (104P/3E)
At approximately 2,300 feet elevation at Atan Lake, 1½ miles east of McDame Post on the Dease River.

Claims: ATAN 1 to 6; AUGUST 1 to 6; ADAIR 1 to 8; WOLF 1, 3, 5, 7; FOX 1; SKI 1 to 18; A, B, C Fractions.

Access: By four-wheel-drive vehicle from Goodhope Lake, 11 miles.

Owner: TOURNIGAN MINING EXPLORATIONS LTD., Box 3859, Vancouver 9.

Metals: Silver, lead, zinc.

Description: Replacement and fracture-filling of Atan Group limestone and dolomite; much cross-faulting and brecciation of the reef structures.

Work done: Gravity survey, 15 line-miles; bulldozing (three days).

References: *Minister of Mines, B.C.,* Ann. Repts., 1949, p. 71; 1967, p. 26; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 43; Assessment Report 1813.

TANZILLA RIVER

MACK (No. 11, Fig. B)

Location: Lat. 58°27.2′ Long. 130°26.4′ (104J/8W)
Between 5,200 and 5,900 feet elevation in a cirque on the southeast side of Snow Peak, 15 miles due west of the south end of Dease Lake.

Claims: MACK 1 to 28.

Access: By helicopter from Dease Lake, 15 miles.

Owner: TOURNIGAN MINING EXPLORATIONS LTD., Box 3859, Vancouver 9.

Metals: Molybdenum, copper, tungsten.

Description: Chalcopyrite, molybdenite, and some scheelite are in quartz veinlets occupying fractures in a quartz monzonite stock.

Work done: Topography mapped; surface geological mapping, 1 inch equals one-half mile on Mack 1 to 28; geochemical soil survey, 50 samples covering Mack 6 and 25; stripping, 225 cubic yards on Mack 6 and 25.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 44.

HU (No. 12, Fig. B)

Location: Lat. 58°20.5–21.5′ Long. 130°10–16′ (104J/8E)
At approximately 4,000 feet elevation on south side of Tanzilla River, 10 miles southwest of south end of Dease Lake.

Claims: HU 1 to 62.

Access: By helicopter from Dease Lake, a distance of 10 miles, or by four-wheel-drive vehicle from Telegraph Creek road.

Owner: Tournigan Mining Explorations Ltd.

Operator: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

Metal: Copper.

Description: Chalcopyrite and pyrite near a contact zone between volcanics and syenite porphyry stock.

Work done: Geochemical soil survey, 800 samples covering HU 1 to 16 and 47 to 52.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 44.

GNAT CREEK

KAY, KIM, KING (No. 13, Fig. B)

Location: Lat. 58° 15–18′ Long. 129°53–59′ (104I/5W)
Near Gnat Lakes, 3 miles west of Cassiar–Stewart road and about 12 miles southeast of Dease Lake.

Claims: KAY 1 to 74, KIM 1 to 14, KING 1 to 10, 21 to 30, 61 to 86.

Access: By the Cassiar–Stewart road, about 95 miles from Cassiar.

Owner: TANZILLA EXPLORATIONS LTD., 1707 West 68th Avenue, Vancouver 14.

Metal: Copper.

Description: Chalcopyrite is disseminated through an altered, mylonitized zone in metavolcanic rocks.

Work done: A geochemichal survey was made and 132 soil and silt samples were analysed for copper. Magnetometer and induced polarization surveys were made and the geology mapped.

References: Assessment Reports 2152, 2622, 2766, 2767.

MOSS (No. 14, Fig. B)

Location: Lat. 58°14–16.5′ Long. 129°50–54′ (104I/5W, 4W)
On the west side of Lower Gnat Lake, about 20 miles south of Dease Lake, at 4,000 feet elevation.

Claims: MOSS, totalling 46.

Access: The Stewart–Cassiar road is less than a mile to the east of the claims.

Owner: LYTTON MINERALS LIMITED, 519, 602 West Hastings Street, Vancouver 2.

Metal: Copper.

Work done: Two thousand three hundred and eighty-five cubic yards of surface trenching was done.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 44.

TANZILLA BUTTE

OWL (No. 15, Fig. B)

Location: Lat. 58°19.5–21′ Long. 129°36–44′ (104I/5E)
Four miles east of the Tanzilla River, 7 miles southeast of Tanzilla Butte.

Claims: OWL 1 to 114.

Access: By helicopter from Dease Lake, 12 to 15 miles.

Operator: UNION MINIERE EXPLORATIONS AND MINING CORPORATION LIMITED, 1000, 1055 West Hastings Street, Vancouver 1.

Metal: Molybdenum.

Work done: Stream- and soil-sampling.

FOUR MILE RIVER

KIRK (No. 16, Fig. B)

Location: Lat. 59°02.2′ Long. 129°09.5′ (104P/3E)
Ten miles south of McDame Post, on Four Mile River south of the junction of Nizi Creek.

Claims: KIRK 1 to 56, NIZI 1 to 60, BOB 1 to 10, PETE 11 to 14, TOM 1 to 4.

Access: By road to McDame Post and thence by bulldozer road to Nizi Creek.

Owner: CRY LAKE MINERALS LTD., 270, 700 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, silver, lead, zinc.

Description: A steeply dipping carbonate-bearing shear zone in andesite, 20 feet wide and 200 feet long, is mineralized with pyrite, chalcopyrite, sphalerite, and minor galena.

Work done: In 1968 an induced polarization survey was made of the Kirk 1 to 10 claims. In 1969 an aeromagnetic survey was made, the claims were mapped geologically, a complete soil survey was made, and about 1,750 feet of bulldozer trenching was done. In 1970, eight holes totalling 1,670 feet were diamond drilled on the Kirk 1 to 8 claims.

References: Assesment Reports 1626, 1831, 2765.

CRY LAKE

GB (No. 17, Fig. B)

Location: Lat. 58°54.8′ Long. 128°52.3′ (104I/15W)
South side of Rapid River, 5 miles north of Cry Lake, 40 miles east of the Cassiar–Stewart road.

Claims: GB 1 to 65.

Access: Eighty miles by helicopter or float plane from Watson Lake, Y.T., to Cry Lake.

Owner: MINEX DEVELOPMENT LTD., 202, 569 Howe Street, Vancouver 1.

Metals: Copper, nickel.

Description: Chalcopyrite and nickeliferous sulphides occur in serpentinite and peridotite on the GB 45 mineral claim.

Work done: Magnetometer and geochemical surveys were made over about 25 miles of line. A small amount of surface trenching was done.

References: Assessment Reports 2580, 2797.

TURNAGAIN RIVER

LUX (No. 18, Fig. B)

Location: Lat. 58°20.8′ Long. 129°02.4′ (104I/6E)
On Two Mile Creek, 4 miles south of its junction with the Turnagain River.

Claims: LUX 1 to 4.

Access: Forty miles by aircraft southeast from Dease Lake.

Operator: SCURRY-RAINBOW OIL LIMITED, 539 Eighth Avenue SW., Calgary 2, Alta.

METAL: Nickel.

DESCRIPTION: Very small amounts of nickel, as millerite, occur disseminated in serpentinized peridotite.

WORK DONE: The geology of the claims was mapped; samples were taken and assayed.

REFERENCE: Assessment Report 2808.

TURN (No. 19, Fig. B)

LOCATION: Lat. 58°27–29′ Long. 128°47–55′ (104I/7W)
At an elevation of 3,000 to 6,500 feet on upper Turnagain River, 2 miles northeast of Hard Creek.

CLAIMS: TURN, COBALT, PYRRHOTITE.

ACCESS: By helicopter, aircraft, or winter road from Dease Lake, 40 miles to the west.

OWNER: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METALS: Copper, nickel.

DESCRIPTION: Chalcopyrite and pentlandite with pyrrhotite in a pyroxenite-peridotite body.

WORK DONE: The geology of the claims was mapped, magnetometer and electromagnetic surveys were made over 50 miles of line, 80 silt samples were collected for geochemical analysis, 11 pack-sack drill holes totalling 403 feet were drilled, and 15 holes totalling 4,690 feet were diamond drilled.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 49; Assessment Report 2056.

WT (No. 20, Fig. B)

LOCATION: Lat. 58°17′ Long. 128°35′ (104I/7E)
At approximately 6,000 feet elevation in the Letain Creek area, 5 miles east of Letain Lake.

CLAIMS: WT.

ACCESS: By float plane from Watson Lake, Y.T., 125 miles.

OWNER: KATANGA MINES LTD., 31, 615 West Hastings Street, Vancouver 2.

METALS: Copper, silver, nickel.

WORK DONE: Surface diamond drilling, 400 feet on WT 56 and 58.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 49.

HERB (No. 21, Fig. B)

LOCATION: Lat. 58°41′ Long. 128°10′ (104I/9E)
At approximately 5,300 feet elevation, 5 miles northwest of the confluence of the Turnagain and Cassiar Rivers.

CLAIMS: HERB 1 to 10.

ACCESS: By helicopter from Watson Lake, Y.T., approximately 100 miles.

OWNER: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METALS: Lead, zinc, silver.

DESCRIPTION: Galena and sphalerite occur in veins in highly kaolinized granite.

WORK DONE: Surface workings mapped; surface geological mapping, 1 inch equals 100 feet on Herb 3 and 4; geochemical soil survey, 114 samples covering Herb 3 to 8; surface diamond drilling, one hole totalling 657 feet on Herb 3.

EWE (No. 22, Fig. B)

Location: Lat. 58°40.6′ Long. 128°08.5′ (104I/9E)
At approximately 6,000 feet elevation, about 3 miles northwest of the mouth of the Cassiar River.

Claims: EWE 1 to 6; SHEEP 1 to 4; LAMB 12; RAM 16, 18; FLY 1 to 12; WINDY 3 to 6; STORMY 3 to 6; NOON 3 to 6; HARD 1 to 4.

Access: By helicopter from Watson Lake, Y.T., approximately 100 air-miles.

Owner: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Tungsten.

Description: Scheelite is disseminated in skarn associated with granite intrusives.

Work done: Surface workings mapped; surface geological mapping, 1 inch equals 100 feet on EWE 3 to 6, SHEEP 1, and LAMB 12; geophysical (ultraviolet lamp) survey covering the same claims; geochemical rock chip survey, 206 samples covering EWE 4 and 5 and SHEEP 1; surface diamond drilling, eight holes totalling 6,895 feet on EWE 3 and 5.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 48.

WOLF, KID (No. 23, Fig. B)

Location: Lat. 58°37–40′ Long. 128°12–14′ (104I/9E)
South side of Turnagain River, 5 miles west of the junction of the Turnagain and Cassiar Rivers.

Claims: WOLF 1 to 20, KID 1 to 4.

Access: Approximately 100 miles by helicopter from Watson Lake, Y.T.

Owner: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Tungsten.

Description: Schists and quartzites are cut by an extensive system of quartz veins, some of which are mineralized with scheelite.

Work done: The geology was mapped; 440 soil samples were collected and analysed for tungsten. A total of 33 pits were excavated for prospecting purposes.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 48; Assessment Report 2643.

TOAD AND RACING RIVERS

TOAD, IT, AT (No. 24, Fig. B)

Location: Lat. 58°31–34′ Long. 125°42–45′ (94K/12E)
On the west side of the Toad River, 20 miles south of the Alaska highway.

Claims: TOAD 1 to 6, TOAD RIVER, IT, AT.

Access: By road and trail south from the Alaska highway.

Owner: CHURCHILL COPPER CORPORATION LTD., Seventh Floor, 1177 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: The claims cover and surround the Toad River copper showings formerly under exploration by Fort Reliance Minerals Limited.

Work done: Grid-lines were cut and surveyed preparatory to further exploratory work.

References: *Minister of Mines, B.C.,* Ann. Rept., 1959, p. 19; Assessment Report 2547.

BOB, RIM, MAD (No. 25, Fig. B)

LOCATION: Lat. 58°33′ Long. 125°33′ (94K/12E)
At approximately 7,200 feet elevation in the Toad River area.

CLAIMS: BOB 1 to 4; RIM 1 to 6, 9 to 13; MAD 1 to 10, 13 to 22.

ACCESS: About 30 miles of gravel road from Mile 437, Alaska highway, and 16 miles of tote-road.

OWNER: ALBERTA COPPER & RESOURCES LTD., 1502 Cambridge Building, Edmonton 15, Alta.

METAL: Copper.

DESCRIPTION: Chalcopyrite-bearing breccia zone and quartz carbonate veins in dolomite and siltstone.

WORK DONE: Road construction, 16 miles; trenching, 1,180 feet on Bob 1 to 4; stripping, 1,222 square yards on Bob 1 to 4.

EAGLE MINE (No. 26, Fig. B)

By A. D. Tidsbury

LOCATION: Lat. 58°33.1′ Long. 125°26.5′ (94K/11W)
Between elevations of 4,800 and 7,300 feet at the head of Cariboo Creek, the south branch of Yedhe (Eagle) Creek.

CLAIMS: EAGLE, BONANZA, DK, LOIS, etc., totalling 399.

ACCESS: Twenty-three miles by road from The Village at Mile 441.8 on the Alaska highway.

OWNER: DAVIS-KEAYS MINING CO. LTD., 806, 1111 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Quartz carbonate veins mineralized with chalcopyrite are associated with gabbroic dykes of pre-Silurian age. The veins are considered to be younger than the dykes and are structurally controlled by northeasterly shearing, which may be localized at dyke margins. The Eagle vein is a mineralized shear-fracture zone with a strong gouge zone along the northwest side. Its strike is northeast and vertical or northwest dipping Development work has proven vertical continuity between elevations of 7,300 and 5,400 feet, with no appreciable change in mineralization nor in grade at depth.

WORK DONE:

A topographic map was prepared and the surface geology of the claims was mapped; 19,000 lineal feet of underground workings was geologically mapped; 23 miles of road was constructed from the Alaska highway to Yedhe and Cariboo Creeks; two steel bridges were built at the Toad River and Yedhe Creek crossings; 12,878 feet of underground workings was driven as follows: Drifting, 4,103 feet on three levels; crosscuts, 2,474 feet on two levels; subdrifts, 3,096 feet on three levels; raises, 3,205 feet from two levels; and 34 underground drill-holes totalling 9,475 feet were diamond drilled.

New buildings include a 28 by 56-foot office, a 24 by 48-foot guest house, a 28 by 116-foot staff house, a 40 by 132-foot cookery-recreation hall, a 40 by 96-foot warehouse, and a 16 by 40-foot steel shop.

Water mains to supply the camp area are buried and are kept frost-free with Pyrotenax cable.

Domestic power is supplied by a 100-kw. Caterpillar diesel generating unit with a 75-kw. standby unit. The operating mine levels have 30-kw. and two 10-kw. units to supply power to mine ventilation equipment.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 51; Assessment Report 2388.

BY (No. 27, Fig. B)

Location: Lat. 58°30.5–33′ Long. 125°18–21′ (94K/11W)
On the south and southwest slopes of Yedhe Mountain.
Claims: BY 1 to 40.
Access: By helicopter from the Alaska highway, 20 miles to the east.
Owner: TANJO MINES LTD., 12503 Grandview Drive, Edmonton, Alta.
Work done: An airborne magnetometer survey of the claims was made.
Reference: Assessment Report 2642.

RICH, TED, ALL (No. 54, Fig. B)

Location: Lat. 58°33′ Long. 125°22′ (94K/11W)
At approximately 5,200 feet elevation, at headwaters of Yedhe Creek and surrounding Yedhe Lakes.
Claims: RICH 1 to 40, TED 1 to 14, ALL 1 to 20.
Access: From Mile 440, Alaska highway, by road 25 miles, thence 6 miles by trail.
Owner: ZENON SILVER MINES LTD., 301, 845 West Pender Street, Vancouver 1.
Metal: Copper.
Work done: Trenching, 210 by 4 by 2 feet on All 3 claim.

MAGNUM MINE (No. 28, Fig. B)

By A. D. Tidsbury

Location: Lat. 58°30.6′ Long. 125°24.2′ (94K/11W)
At the headwaters of Delano Creek, between elevations of 5,100 and 6,700 feet.
Claims: Fifty-eight claims, including the ME, DAN, MAC, HI groups.
Access: By 35 miles of gravel road southwest from Mile 401 on the Alaska highway.
Owner: CHURCHILL COPPER CORPORATION LTD., 1177 West Hastings Street, Vancouver 1.
Metal: Copper (*see* Table 1 for production).
Work done:

The 750-tons-per-day rated concentrator was completed and put into service in June. The copper concentrate was trucked to Fort St. John and shipped via Pacific Great Eastern Railway to Vancouver.

In the mine, work included:

Drifts and crosscuts	4,704 feet
Raises	4,838 feet
Diamond drilling, underground	12,833 feet
Ore mined	166,958 tons
Waste mined	17,108 tons

Other work included:

Concentrator and Racing River townsite water system and pumphouse completed.

Completion of tailings pond.

Bunkhouse and kitchen complex moved from concentrator site to the mine site.

Telephone line installed, mill to mine (13 miles).

A 64 by 50-foot powerhouse-compressor room erected at the mine site. Three Caterpillar 600-kva. diesel generators installed and two 2,300-cubic-feet-per-minute stationary compressors put in service.

A 40 by 90-foot machine shop and a 28 by 54-foot warehouse were built at the mine site.

A mine air-heating system using waste heat from the generating motor coolant was installed.

The mine-site water system was revised and includes a 50,000-gallon storage tank.

Total generating capacity at mine site and millsite is 3,225 kva.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 50.

JAN, FOX, RANDI (No. 29, Fig. B)

LOCATION: Lat. 58°29.5–31′ Long. 125°23–27′ (94K/11W, 6W) Adjoining Churchill Copper Corporation claims on Delano Creek on the west, north, and northeast.

CLAIMS: JAN 1 to 17, FOX 1 to 20, RANDI 1 to 16, TAX 1 to 4, CAL 1 to 3.

ACCESS: From Mile 401, Alaska highway, 35 miles by Magnum mine road.

OWNER: KEY POINT MINES CO. LTD., Box 1503, Prince George.

METAL: Copper.

DESCRIPTION: Quartz carbonate veins mineralized with chalcopyrite in northwesterly trending shear zones along diabase dykes.

WORK DONE: About 500 lineal feet of surface trenching was done on the Fox 5 and Jan 9 mineral claims.

LADY LUCK (No. 30, Fig. B)

By A. D. Tidsbury

LOCATION: Lat. 54°28′ Long. 125°23.8′ (94K/6W) On the west side of the north branch of Delano Creek.

CLAIMS: LADY LUCK 1 to 12; LOLI 1, 2; LADY 1 to 6; BOX 1 to 16; NIP 1 to 6.

ACCESS: By a 1½-mile road branching to the south from the Churchill mine road.

OWNER: LARGO MINES LTD., 1110 One Bentall Centre, Vancouver 1.

METAL: Copper.

DESCRIPTION: Quartz carbonate veins in fissure zones are mineralized with chalcopyrite.

WORK DONE: From the drift, previously driven, a raise was collared 440 feet in from the portal and driven up the vein 258 feet through to the surface. The surface and underground workings were geologically mapped. Total amount of underground work was 430 feet.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 50.

LEE, OLE (No. 31, Fig. B)

LOCATION: Lat. 58°27–29.5′ Long. 125°22–24′ (94K/6W) North and south of Delano Creek, adjoining Magnum mine claims on the east and south.

CLAIMS: Thirty-two LEE, 20 OLE.

ACCESS: From Mile 401, Alaska highway, 35 miles by Magnum mine road.

OWNER: GREAT NORTHERN PETROLEUMS AND MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

METAL: Copper.

Description: Geological and geochemical surveys of the group were made in 1969. No mineralized showings have been found.

Work done: Three and one-half miles of access road was built into the Lee and Ole claims.

Reference: Assessment Report 2264.

JOAN, BE (No. 32, Fig. B)

Location: Lat. 58°28.6′ Long. 125°17.4′ (94K/6W)
On Delano Creek, 6 miles west of the Racing River.

Claims: JOAN 1 to 42, BE 1 to 36.

Access: By the Magnum mine road from the Alaska highway.

Owner: R. W. SHAW, 2675 West 42nd Avenue, Vancouver 13.

Metal: Copper.

Description: Chalcopyrite mineralization occurs near the initial posts of the Joan 13 and 14 claims.

Work done: An aeromagnetic survey of the claims was made.

Reference: Assessment Report 2641.

MEINDL (No. 33, Fig. B)

Location: Lat. 58°24′ Long. 125°36.5′ (94K/5E)
At approximately 6,000 feet elevation, 10 miles southwest of the Magnum mine, on the southeast fork of the Toad River.

Claims: MEINDL 1 to 42.

Access: From Yedhe Creek by helicopter, 15 miles.

Owner: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

Metals: Copper, silver.

Description: Chalcopyrite and bornite occur in quartz carbonate veins along faults localized along contacts between Proterozoic diabase dykes and sedimentary rocks.

Work done: Surface geological mapping, 1 inch equals 500 feet on Meindl 1 to 42; trenching on Meindl 9 and 11.

HO, JOHN (No. 34, Fig. B)

Location: Lat. 58°19.5–24′ Long. 125°09.5–17′ (94K/6E, 6W)
At 5,000 feet and 5,200 to 6,500 feet elevation on the west side of Churchill Creek, 5 to 11 miles south of Delano Creek.

Claims: HO, JOHN, L, M, PINE, totalling 247.

Access: By road from Mile 401 on the Alaska highway, 29 miles.

Owner: COPPERLINE MINES LTD., 400, 1055 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Quartz carbonate veins contain disseminations, stringers, and massive pods of chalcopyrite.

Work done: Topography mapped; surface workings mapped; trenching, 6,900 feet on the John 21, 22, 28, and 55 claims and the HO 19 and 21 claims; road construction, 7 miles south on Churchill Creek from the Churchill Copper mine concentrator.

GATAGA RIVER

GATAGA (No. 35, Fig. B)

LOCATION: GATAGA 9 and 11: Lat. 58°13.4′ Long. 125°20.8′ (94K/3W)
GATAGA 19: Lat. 58°12.3′ Long. 125°21′
Six miles southwest of Churchill Peak.

CLAIMS: GATAGA 1 to 20.

ACCESS: By helicopter from the Alaska highway.

OWNER: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Quartz carbonate veins mineralized with chalcopyrite and pyrite occur along the margins of diabasic dykes on the Gataga 9, 11, and 19 claims.

WORK DONE: The claims were prospected and geologically mapped and the veins mapped and sampled.

REFERENCE: Assessment Report 2639.

BRONSON (No. 36, Fig. B)

LOCATION: Lat. 58°11.3′ Long. 125°18.2′ (94K/3W)
Five miles southwest of Churchill Peak.

CLAIMS: BRONSON, BRON, totalling 96.

ACCESS: Twenty-five miles by helicopter from the Churchill Copper Corporation millsite.

OWNER: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Several quartz carbonate veins mineralized with chalcopyrite and bornite are associated with a swarm of diabasic dykes striking northwest and dipping steeply southwest.

WORK DONE: The claims were mapped geologically and five veins mapped and sampled. Some stripping was done on the Bron 17 and 170. At elevation 6,850 feet an adit was driven 72 feet, and from it three diamond-drill holes totalling 2,501 feet were drilled.

REFERENCE: Assessment Report 2487.

428 (No. 37, Fig. B)

LOCATION: Lat. 58°12–13.8′ Long. 125°15–17.6′ (94K/3W)
Three miles southwest of Churchill Peak.

CLAIMS: 428 Nos. 1 to 14, 16, 18, 20 to 24, 26, 28, 30, 32, 34 (26 in all).

ACCESS: By helicopter from the Churchill Copper camp on the Racing River or from the Alaska highway.

OWNER: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Quartz carbonate veins mineralized with chalcopyrite and minor amounts of galena are localized along the margins of diabasic dykes on the 428 Nos. 3, 4, 5, 9, 11, and 24 claims.

WORK DONE: The claims were prospected and mapped geologically and the veins mapped and sampled.

REFERENCE: Assessment Report 2644.

PJ (No. 38, Fig. B)

Location: Lat. 58°07–12′ Long. 125°15.2–17.2′ (94K/3W)
At 4,500 feet to 7,000 feet elevation at the headwaters of the Gataga River, 8 miles southwest of Churchill Peak.

Claims: PJ, 86 in all.

Access: By fixed-wing aircraft from Fort Nelson, 120 miles.

Owner: BRALORNE CAN-FER RESOURCES LIMITED, 320, 355 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Chalcopyrite with minor bornite, pyrite, and chalcocite occurs in quartz carbonate veins and vein swarms in Proterozoic clastic rocks closely associated with diabasic dykes.

Work done: Surface geological mapping, 1 inch equals 500 feet on all claims; trenching, 300 feet.

Reference: Assessment Report 2837.

BOOK (No. 39, Fig. B)

Location: Lat. 58°09.2′ Long. 125°19′ (94K/3W)
Seven and one-half miles southwest of Churchill Peak.

Claims: BOOK 1 to 10.

Access: Twenty-five miles by helicopter from the Churchill Copper Corporation concentrator.

Owner: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Quartz carbonate veins along the margins of diabasic dykes are mineralized with chalcopyrite and minor amounts of galena.

Work done: The claims were prospected and geologically mapped and the veins mapped and sampled. Some trenching was done on the Book 9 and 10 claims.

References: Assessment Reports 2638, 2487.

CHOPPER (No. 40, Fig. B)

Location: Lat. 58°06.5–07.2′ Long. 125°12.4–13′ (94K/3E)
Eight and one-half miles south of Churchill Peak.

Claims: CHOPPER 1 to 14.

Access: By helicopter from the Alaska highway.

Owner: WINDERMERE EXPLORATION LTD., 1418, 355 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Quartz carbonate veins mineralized with chalcopyrite and minor amounts of galena occur along the margins of diabasic dykes on the Chopper 3, 5, 7, and 9 claims.

Work done: The claims were prospected and geologically mapped and the veins mapped and sampled.

Reference: Assessment Report 2640.

ITSILLITU CREEK

DISCO (No. 41, Fig. B)

LOCATION: Lat. 58°13′ Long. 130°20′ (104J/1W)
At approximately 4,400 feet elevation, between the headwaters of Pallen and Itsillitu Creeks, 37 miles northeast of Telegraph Creek.

CLAIMS: DISCO 1 to 95, CHOPPER 1 to 35.

ACCESS: From Stikine Crossing by helicopter, 20 miles.

OWNER: NEWMONT MINING CORPORATION OF CANADA LIMITED, 1230, 355 Burrard Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Copper and molybdenum mineralization occurs as fracture-fillings and disseminations within a granodiorite and volcanics near the intrusive contact.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on Disco 21 to 26, 41, 43, 45, 69, and 70; magnetometer survey, 14 line-miles covering Disco 19 to 24, 39, 41, 43, 69, and 70; geochemical soil survey, 2,594 samples covering Disco 7 to 27, 29, 31, 33, 35 to 45, 69, 70, and Chopper 15 to 18; hand-trenching, 500 feet on Disco 15, 21 to 24, 41, 43, 69, 70, and Chopper 15 to 18.

TAHLTAN RIVER

PINTO (No. 52, Fig. B)

LOCATION: Lat. 58° Long. 131° (104J/3E)
Between 500 and 2,500 feet elevation on the north bank of the Stikine River, about 1 mile downstream from the mouth of the Tahltan River.

CLAIMS: PINTO 1 to 38.

ACCESS: From Telegraph Creek by road, about 10 miles.

OPERATOR: GYPSY QUEEN EXPLORATIONS LTD., 91, 845 Hornby Street, Vancouver 1.

METALS: Copper, silver, gold, titanium, cadmium.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 1,000 feet on Pinto 1 to 38; magnetometer survey, approximately 3 line-miles covering Pinto 15 and 16; geochemical soil survey, 110 samples covering Pinto 15 and 16; two trenches, 535 by 16 by 5 feet and 450 by 16 by 4 feet.

PORCUPINE RIVER

RM (No. 53, Fig. B)

LOCATION: Lat. 57°03′ Long. 131°39′ (104G/4E)
At approximately 3,000 feet elevation on the north side of the Porcupine River, 1½ miles from conflux with Stikine River.

CLAIMS: RM 1 to 10.

ACCESS: From Wrangell, Alaska, by boat or plane, 35 air-miles.

OWNER: HONDA MINING CO. LTD., 204, 540 Seymour Street, Vancouver 2.

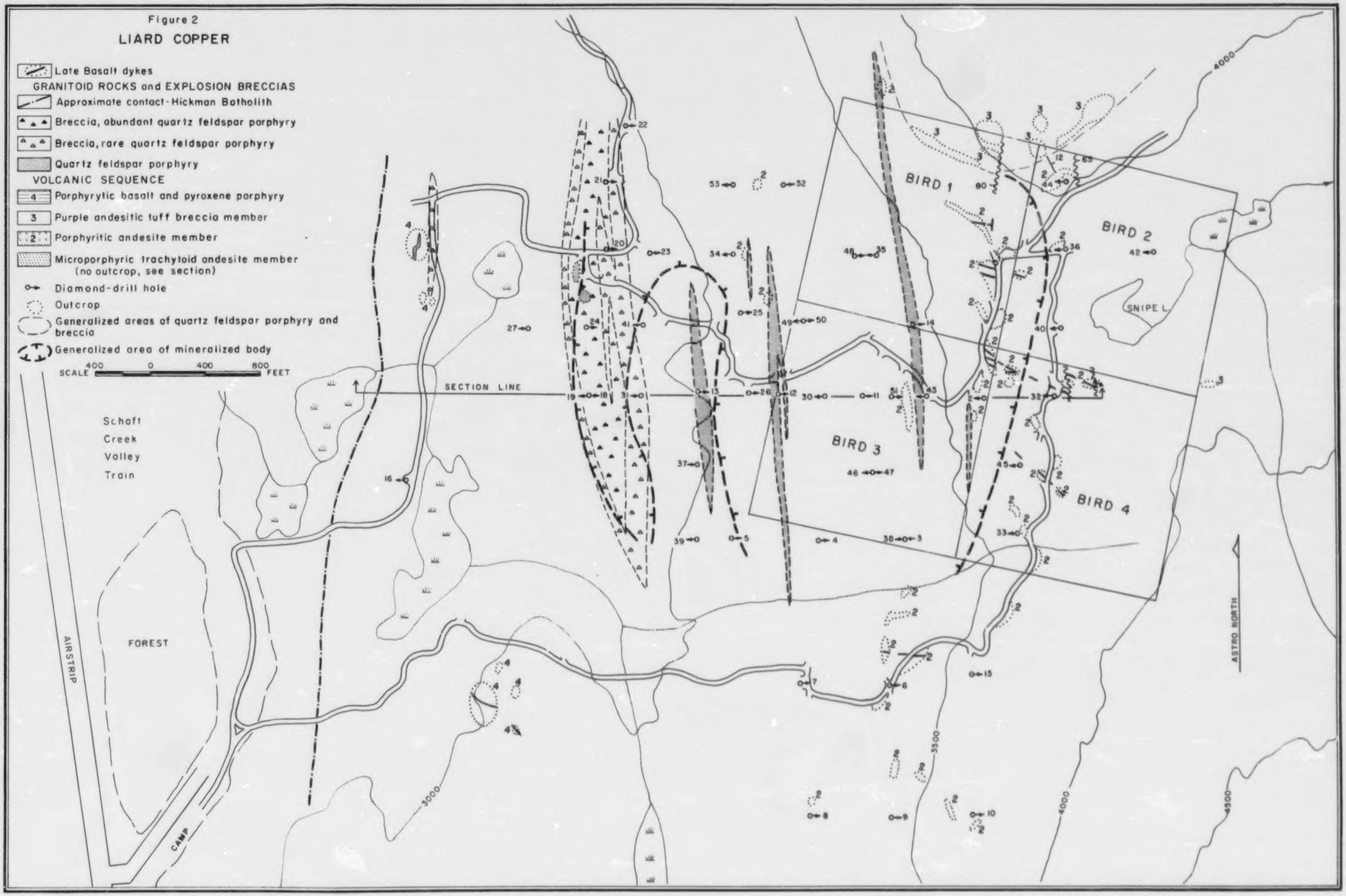
METAL: Copper.

WORK DONE: Surface diamond drilling, one hole totalling 230 feet on RM 4.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 46.

Figure 2

LIARD COPPER


Late Basalt dykes
GRANITOID ROCKS and EXPLOSION BRECCIAS
Approximate contact-Hickman Batholith
Breccia, abundant quartz feldspar porphyry
Breccia, rare quartz feldspar porphyry
Quartz feldspar porphyry
VOLCANIC SEQUENCE
4 Porphyrytic basalt and pyroxene porphyry
3 Purple andesitic tuff breccia member
2 Porphyritic andesite member
Microporphyric trachytoid andesite member (no outcrop, see section)
Diamond-drill hole
Outcrop
Generalized areas of quartz feldspar porphyry and breccia
Generalized area of mineralized body
SCALE 400 0 400 800 FEET
SECTION LINE
Schaft Creek Valley Train
FOREST
AIRSTRIP
CAMP
BIRD 1
BIRD 2
BIRD 3
BIRD 4
SNIPE L.
ASTRO NORTH
3000
3500
4000
4500

MESS CREEK

SNO, BIRD (LIARD COPPER) (No. 42, Fig. B) By A. Sutherland Brown

Location: Lat. 57°21′ Long. 130°56′ (104G/7W)
Thirty-eight miles south of Telegraph Creek, east of the junction of Hickman Creek with Schaft Creek, between elevations 3,000 and 4,000 feet.

Claims: Five hundred and seventy-four claims located as the SNO, BIRD, NOV, ID, GAV, BUD, DIT, SUE, ASH, WIN, RUM, VON, EMU, NABS, BB, MESS, BARB groups.

Access: Local transportation was from Terrace and Stewart by Transprovincial Airlines twice weekly by Otter aircraft. Freight was handled by Transprovincial Airlines from Terrace or Harrison Airways from Vancouver.

Owners: Hecla Operating Company, Liard Copper Mines Ltd., and Paramount Mining Ltd.

Operator: HECLA OPERATING COMPANY, 2009, 1177 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description:

Introduction

The Liard Copper property is a copper-molybdenum deposit of large size. It was discovered by classical prospecting by Nick Bird in 1957 for the BIK Syndicate (Silver Standard Mines Limited, McIntyre Porcupine Mines Limited, and Kerr Addison Mines Ltd.). Liard Copper Mines Ltd. was formed in 1966 to explore and develop the property with the main principals those of the BIK Syndicate. The property has been explored under agreement by American Smelting and Refining Company in 1966–67 and since then by Hecla Operating Company. The Nabs claims that lie to the north of Liard Copper claims are held by Paramount Mining Ltd. and have also been explored by Hecla under agreement since 1969. The writer visited the property for 2½ weeks in August 1970, during which the sparse outcrop in the vicinity of the mineral deposit was mapped and the core from the top of all holes logged as well as that of one complete section.

Regional Geology

The Liard Copper deposit is situated on the eastern margin of the Boundary Ranges of the Coast Mountains where they abut the Tahltan Highlands of the Stikine Plateau. The deposit is located on the western flank of a saddle between two mountains that form a narrow ridge between the north-flowing streams of Schaft and Mess Creeks. The geology of the terrain between the creeks is complicated compared to that on either side. West of Schaft Creek is the zoned Triassic Hickman Batholith, and east of Mess Creek are the late Cenozoic volcanic edifaces of Edziza Peak and the Spectrum Range. The terrain between the creeks and a narrow zone east of Mess Creek is underlain by a variety of stratigraphic units of Permian and younger age. The oldest rocks are Permian limestones that occur low on the slope near Mess Creek. These appear to be in fault contact with a thick sequence of andesitic pyroclastic and flow rocks of Permian or more likely Triassic age. These are the main host of the mineral deposit. They are overlain or possibly in fault contact with volcanic sandstones and conglomerates composed of clasts identical to the main volcanic pile but including quartz feldspar porphyries. From certain of these beds a sparse, heavy shelled Triassic fauna was collected by the writer. These rocks are in turn overlain by volcanic epiclastic volcanic rocks that grade upward to a reddish

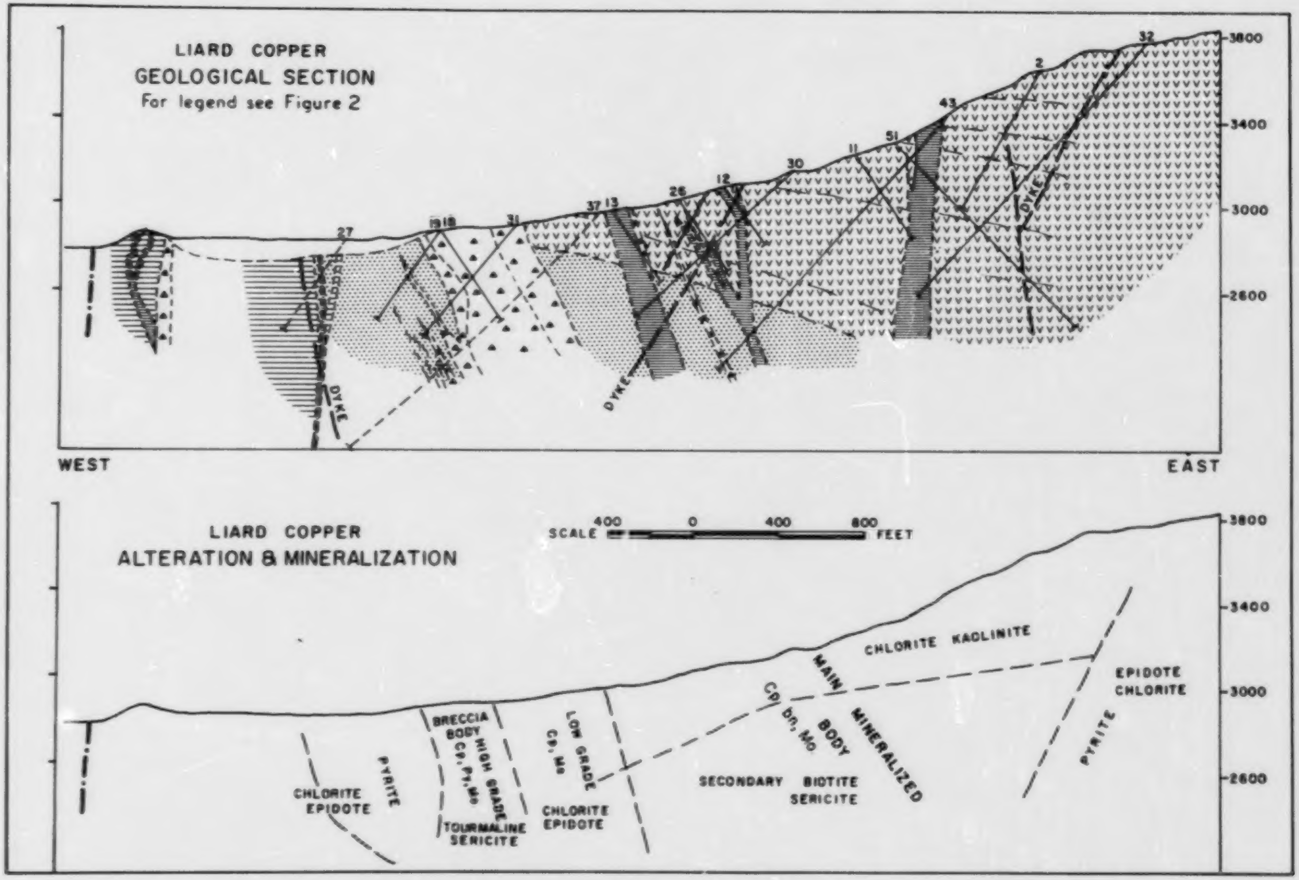

LIARD COPPER
GEOLOGICAL SECTION
For legend see Figure 2
32
2
43
51
11
30
12
26
37
13
31
19
18
27
DYKE
DYKE
DYKE
WEST
EAST
3800
3400
3000
2600
LIARD COPPER
ALTERATION & MINERALIZATION
SCALE
400
0
400
800
FEET
CHLORITE KAOLINITE
MAIN
MINERALIZED
BODY
Cp
bn, Mo
SECONDARY BIOTITE
SERICITE
EPIDOTE
CHLORITE
PYRITE
LOW GRADE
Cp, Mo
CHLORITE
EPIDOTE
BRECCIA
BODY
HIGH GRADE
Cp, Py, Mo
TOURMALINE
SERICITE
PYRITE
CHLORITE
EPIDOTE
3800
3400
3000
2600

Figure 3. Sno, Bird (Liard Copper), geological section and diagram of alteration and mineralization.

conglomerate and arkose that resemble ones that elsewhere in the area are of Lower Jurassic age. These conglomerates and arkosic sandstones are composed of clasts of andesites and granitic porphyries, some of which show evidence of hydrothermal alteration.

Numerous intrusive bodies cut parts of this sequence. Bosses similar to the Hickman Batholith that crop out on the lower slopes near Mess Creek may indicate this body underlies the mineral deposit. In addition, a group of pyroxene-rich porphyritic basalts occur as large dyke-like bodies within the main volcanic pile and on the mountain to the south. Rhyolite and basalt dykes of probable Cenozoic age are numerous throughout the area.

Although the terrain has been involved in numerous deformations, the prevailing bedding attitudes, where determinable, are mostly striking northerly and dipping gently eastward. The area has been sliced by numerous steep faults, many of which strike north to north 35 degrees west. At least one of these faults northeast of the deposit has a vertical movement which drops the west block at least 1,500 feet.

Detailed Geology

Exposure in the vicinity of the mineral deposit is very poor except for a few rock drumlins in the valley of Schaft Creek, and near the break at the edge of the saddle where drift cover is slight and bulldozer stripping has augmented the sparse natural exposure. The geology of a major part of the property is shown on a plan, Figure 2, and section, Figure 3, based largely on drill holes completed prior to the writer's visit in August 1970.

The main host of mineralization is volcanic rock of Triassic (or Permian?) age that occurs in a gentle east-dipping panel. The part of this pile that is definitely stratified is composed entirely of porphyritic andesites, most of which are of pyroclastic origin. They have been separated into three members on the basis of differing texture or colour of the dominant rocks in the member, but the distinctions are slight. The lowest member is characterized by abundant microporphyritic trachytic andesite, the middle member by green crowded porphyritic andesite, and the uppermost by purplish porphyritic andesite tuff breccia. The lowest unit does not crop out in the map-area of Figure 2, although it should occur below the swamps and alluvium in the western part. The middle member is exposed sparsely over much of the map-area, especially near the saddle. The upper member outcrops on the lower slopes of the mountains both north and south of the saddle. These stratified rocks are associated with pyroxene-rich basalts that appear to be large dyke-like bodies, but they may in part form an original part of the volcanic pile. Into the volcanic sequence, a group of north-trending and mainly steeply east-dipping quartz feldspar porphyry dykes have been intruded. In the western part of the property the volcanic sequence is cut by a lineal breccia body that is intimately associated with the quartz feldspar porphyry dykes. The mineralization is also intimately associated with the quartz feldspar porphyry dyke intrusions. Although a variety of young dykes are common in the surrounding area in the vicinity of the mineral deposit, these are limited to a swarm of steep basalt dykes oriented north and northwesterly.

Petrology

Andesites—The distinction between the various members of the volcanic sequence is slight as they are all chemically and petrologically similar although texturally slightly different (*see* accompanying table). The sequence is dominated by pyroclastic rocks of fairly homogeneous nature, ranging from fine tuff to tuff

Petrography of Andesites and Quartz Feldspar Porphyry

LIARD COPPER

	Phenocrysts						Matrix							R.I. of Fused Bead, Average and Range
	Plagioclase	Composition	Quartz	Pyroxene	Hornblende	Biotite	Plagioclase	Quartz	Pyroxene	Chlorite	Ores	Glass	Other	
Microporphyritic trachytic andesite	60	An_{30-40}	×	7½	×	×	7	4	×	17	5	×	½	1.533± .004
Crowded porphyritic andesite	65	An_{30-60}	×	8	×	×	10	2	½	8	4½	×	2	1.564± .014
Purple andesitic tuff breccia	37	An_{35-40}	×	6	×	×	7	1½	×	20±	5	20±	3	1.550± .012
Quartz feldspar porphyry	48	$An_{35\pm}$	½	×	4	4	18	14	×	8	3	×	½	1.510± .008

breccia. All are porphyritic andesites with refractive indices of fused beads ranging from 1.538 to 1.578, with the average of 13 fresh specimens being 1.556.

In hand specimen they are somewhat variable, depending mainly on degree of alteration. Most of the lower two members are fairly dark-green, fine-grained rocks that usually show abundant phenocrysts but may not show their fragmental nature. In contrast, specimens of the upper member normally show their subangular fragmental nature. The average size of large clasts is about one-half inch, with ones larger than 6 inches rare. They are normally some shade of dark purple, but this colour may be confined to the finely comminuted matrix. Abundant phenocrysts about 1 to 2 millimetres long are evident in most clasts.

The lowest member is characterized by pyroclastic and possibly flow rocks composed of microporphyritic andesite with trachytic alignment of the plagioclase microphenocrysts. Crowded porphyries similar to those of the middle member are also fairly common. The average composition of relatively fresh specimens is shown on the accompanying table. A great variety of textures may be included even within one specimen, but the commonest is a crowded microporphyry composed of 60 per cent or so aligned plagioclase, 0.2 to 0.07 millimetre long, with some pyroxene crystals that are normally completely chloritized in a matrix of chlorite and opaques with minor quartz. The plagioclase which shows minor simple zoning and is possibly homogenized, ranges from An_{50-40}.

The middle member is characterized by greenish, crowded porphyritic andesite. Some of the member may be composed of flows or flow breccias, but most is truly pyroclastic. These rocks range from crystal-lithic tuffs of sand size to tuff breccias with subangular clasts as large as 6 inches in diameter. The clasts are dominantly formed of crowded porphyry, but a few clasts of trachytic microporphyry are evident in most specimens. Fresh crowded porphyry consists of about 65 per cent chunky plagioclase crystals 0.5 to 4 millimetres long, 8 per cent pyroxene crystals of the same size in a fine matrix of plagioclase, chlorite, ores, and minor quartz. The plagioclase is simply zoned or unzoned of An_{60-50} composition, and the pyroxene is hypersthene.

The upper member is characterized by purple porphyritic andesite tuff breccias. The clasts of the rocks of the member are fairly variable in texture ranging from glomeroporphyries to fine trachytic microporphyries, but are normally fairly homogeneous in one specimen or area. They are all characterized by a purplish colour from disseminated hematite and many types have a devitrified very fine semi-opaque matrix. The plagioclase phenocrysts may show some oscillatory zoning and range from An_{55-40}. Some of the differences of the rocks of this member with the lower two may be the result of its being less hydrothermally and thermally metamorphosed, but it is nevertheless somewhat distinctive.

Basalts—Pyroxene basalts and related rocks appear to be intrusive into the andesite pyroclastic sequence in the western part of Figure 2. Similar rocks occur in steeply dipping, possibly intrusive units on the mountain south of the saddle. In hand specimen they are all dense dark-green rocks with or without prominent pyroxene prisms 3 to 6 millimetres in diameter. These rocks have a range of compositions, but all, even the fine-grained ones, contain phenocrysts of pyroxene. Some specimens are actually ultramafic and appear to be cumulates of one sort or another. The fundamental rock appears to be a basalt with prominent chunky pyroxene phenocrysts. In the map-area these rocks are highly altered except for those in the southernmost exposures. These illustrate irregular gradation from a sparsely porphyritic basalt to cumulate-like rocks dominated by augite and pigeonite prisms. The latter rocks are composed of 40 per cent pyroxene and 10 per cent bytownite phenocrysts in a fine matrix (0.1 millimetre) of plagioclase (25 per cent), pyroxene (15 per cent), ores (5 per cent), and amygdules filled with zeolites (5 per cent). The pigeonite is mostly chloritized, but other minerals are fairly fresh. The finer rocks are basalts, with intersertal to subophitic texture containing about 10 per cent small pyroxene phenocrysts. The latter may be up to 1 millimetre long in a matrix with crystals that average 0.2 millimetre long. Many of the augite phenocrysts are chloritized with an opaque rim. The matrix contains subequal amounts of pyroxene and labradorite with up to 5 per cent ores.

Quartz feldspar porphyries—In hand specimen the porphyries appear more variable than they actually are because they vary in colour from pink through flesh-coloured to grey. Actually, unaltered specimens are very uniform, with abundant light-coloured plagioclase about 1 to 3 millimetres long and scattered mafic phenocrysts in a fine, glassy looking matrix. The accompanying table shows the average composition. This normally consists of about 50 per cent chunky plagioclase of about An_{33} composition with scattered resorbed quartz grains and chloritized hornblende and biotite phenocrysts that are more or less in contact, but with interstices filled by a fine mosaic of feldspar, quartz, and chlorite and ores. Apatite is a common accessory and may be of phenocryst size. The refractive indices of fused specimens are fairly uniform, 1.510± .008, and are equivalent to the boundary between rhyolites and dacites. Potash feldspar is not obvious in unaltered specimens, so that the composition is likely to be equivalent to a felsic quartz diorite, rather than a quartz monzonite.

Some small dykes of grey aplite occur that are generally of similar composition, but with only about 5 per cent microphenocrysts in a groundmass similar but more feldspathic than the matrix of the porphyries.

Breccias—The breccia body shown on Figure 2 in the western part of the areas has considerable lineal continuity. It is shown in plan as a flat lens, but projections from the various drill holes indicate that in section it is fairly irregular, with tongues extending upward as shown. It is composed of more than one type and age of breccia. Its attitude is similar to adjacent porphyry dykes, that is, strike northward and dip steeply eastward. It is continuous north of the map-area onto the adjacent property of Paramount Mining Ltd.

The composition of the clasts in the breccia in a general way grades inward from its borders, which are composed wholly of volcanic clasts, to the centre, which is almost wholly quartz feldspar porphyry. The illustration shows a central zone that is composed of abundant porphyry fragments, and an outer zone in which these are rare. Most of the volcanic clasts are of trachytic microporphyritic andesite similar to the lower unit. In fact, the walls of the "pipe" may be sharp or alternatively may grade through a zone with increasing degree of shattering.

The appearance of the main type of breccia can be spectacular or fairly subtle. In general, the subtle breccias are ones composed entirely of volcanic fragments and the spectacular ones either of porphyry or mixed clasts in a tourmaline and (or) sulphide-rich matrix. The clasts vary greatly in size from pulverized material in the matrix to some 6 feet or more long indicated in the core, with the distinct possibility of some very much larger. In general, all clasts in the main breccia are angular and some are clearly just "exploded" from the adjacent fragments. Just as clearly others are rotated or there may be an admixture of types, with rare porphyry fragments occurring in mainly volcanic breccia and vice versa. Fragments with one angular side bordered by a quartz veinlet are common. Comminuted matrix did not completely fill all space as minor irregular areas of drusy clear quartz crystals surrounded by calcite now fill these original voids. The matrix is replaced by rosettes of tourmaline and by quartz and irregular large apatite crystals, as well as sulphides. The latter minerals dominantly replace matrix, except in zones of most intense mineralization where replacement extends into fragments. Either chalcopyrite or pyrite may be the main mineral and the latter commonly occurs as pyritohedrons. Molybdenite is only rarely abundant and bornite is absent.

Cutting through the main breccia are bands several feet to 10 feet wide that consist of a different type of breccia in which most of the clasts are relatively small. Most are rounded fragments 5 millimetres or less, with average about 0.5 millimetre. Some clasts resemble matrix of the main breccia. There may be a foliated fabric resembling a mylonite. The relationship to sulphide mineralization is equivocal, as chalcopyrite and pyrite occur in some of the fine abraded breccia in a manner indicative of replacement and in other sulphides appear to be clasts, smeared bands, or pulverized. The latter cases are most common in mylonitic-looking breccias, so possibly there are actually two younger brecciations.

Post-ore basalts—Basalt dykes that cut vein mineralization and altered zones are numerous. Two differing types exist: a dense fine-grained black rock and a similar rock with glomerophenocrysts of labradorite. The matrix of the latter and the fine-grained basalt consist of subequal amounts of fine plagioclase and partly chloritized augite with 3 to 4 per cent finely disseminated magnetite and some chlorite-filled amygdules of irregular shape.

Alteration

The pattern of alteration of Liard Copper is not simple but appears to be related to two culminations, one coaxial with the breccia body, the other with a source of heat and fluids(?) at depth below the deposit. Figure 3 shows the relations in section and Figure 2 shows the general plan of the mineralized body with a high-grade zone related to the breccia body, a low-grade core, and a main mineralized body to the east. The most intense alteration and metasomatism occur in the breccia body where the matrix has been replaced in significant amounts by sulphides, tourmaline, apatite, epidote, and chlorite. Clasts are generally intensely altered also with plagioclase very extensively sericitized, or in certain locales altered in part to potash feldspar. Mafic minerals are extensively chloritized, but this may in turn be replaced by carbonate. Silicification is also present in isolated locales, but matrix of quartz feldspar porphyry clasts is commonly coarsely recrystallized.

The alteration pattern beyond the breccia body is related in part to depth and partly to the outline of the mineralized body. Peripheral to the chalcopyrite and molybdenite mineralization there is an intense pyrite halo that grades rapidly outward to a zone of minor pyrite. This external zone is also characterized by intense epidote and chlorite. A similar chlorite-epidote zone occurs in the low-grade core, hence this may actually represent the level of metamorphism. In the main mineralized body there is subhorizontal zoning of alteration not coincident with the bedding. In the upper zone, plagioclase is fairly intensely altered to kaolinite with minor sericite, and mafic minerals are entirely chloritized and there is some carbonate in the matrix. Two hundred to 400 feet below the surface is a zone of secondary biotite in which all mafic minerals are altered to fine felted biotite and plagioclase to sericite and kaolinite.

Structure

The stratified pyroclastic sequence dips gently eastward. Numerous faults are evident as gouge and sheared zones in the core, but it is difficult to assess the importance of these faults. Faults evident on the surface are small ones which strike northward and dip steeply in either direction. They cut the post-ore basalts.

The quartz feldspar porphyry dykes and the breccia body strike northward and mostly dip steeply eastward. Outcrops of bosses similar to Hickman quartz monzonite on the lower slopes near Mess Creek indicate the whole region of the ore deposit may be underlain at no great depth by a lateral protuberance of this zoned pluton. If this is true, the porphyry dykes seem likely to have originated from it.

Evidence bearing on the origin of the breccia body includes:

(1) Inward zoning of the body to quartz feldspar porphyry-rich breccia.
(2) Minor breccia zones fringing other quartz feldspar porphyry dykes.
(3) Volcanic clasts in breccia similar to those of adjacent walls not those of higher strata.
(4) Clasts indicating an early fracturing and quartz stockwork.
(5) "Exploded" nature of much of the breccia.
(6) Mixing of clasts, with commonly a few volcanic in porphyry and vice versa.
(7) Second breccia with indications of attrition that cuts the earlier main breccia.

These facts are most compatible with an origin by explosion and not by collapse or faulting. Development most likely started with intrusion of a large porphyry dyke, followed by crackle brecciation and emplacement of quartz with minor sulphides in a fracture stockwork, then explosion with continuing elutriation along selective bands. The main mineralization followed with mylonitization occurring along a few planes possibly long after the main episode.

Mineralization

The Liard Copper deposit is a porphyry deposit of distinctive type; a complex deposit in which most of the ore is developed in pyroclastic volcanic rocks that are cut by quartz feldspar porphyry dykes and a related breccia body. The sulphide mineralization has a zonal relationship to the porphyries and breccia body. The deposit is similar in many features to the Island Copper deposit of northern Vancouver Island.

The ore mineralogy is simple, consisting of bornite, chalcopyrite, pyrite, and molybdenite, with minor hematite and magnetite. Secondary ore minerals and minor late veins of galena, sphalerite, and sulphosalts are notable by their general absence, although late carbonate and gypsum veinlets are common. The gross distribution of sulphide minerals is related to the geology. Pyrite forms a halo that is wedge-shaped or inward-dipping in section. Pyrite is most intense on the fringe of the orebody and in the breccia body, and grades rapidly outwards to minor disseminated pyrite. Chalcopyrite is ubiquitous throughout the mineralized body but most prominent in the breccia body, where it occurs with much pyrite. Molybdenite is also widely distributed, but the highest concentrations are closely associated with the quartz feldspar porphyry dykes. It is present but not prominent in the inner breccia zone. Bornite is widely distributed in the main mineralized body, but is not present in the highly pyritic breccia zone. Pyrite is rare in the main mineralized body, except on its fringe.

In the breccia body most of the ore occurs as replacement of the matrix with a minor amount replacing fragments. Pyrite is commonly crystallized as pyritohedral crystals. Veins as such are very rare except for a few late ones. The early ruptured quartz veinlets of breccia clasts carry traces of chalcopyrite and pyrite. In the main mineralized body most of the ore minerals are present in fine sugary quartz veinlets or dry fractures with some disseminated mineralization in some high-grade sections.

The history of fracturing and veinlet formation is complex, but there are three general groups of veinlets. The earliest are barren quartz, chlorite, and minor hematite or thin magnetite-rich veinlets. The main period of vein formation followed with overlapping dry fractures carrying sulphide minerals and chlorite and veinlets of quartz, sulphides, with minor chlorite, sericite, and calcite. The period of replacement in the breccia body was presumably coincident with this. Late veinlets of carbonate with minor drusy quartz may be of several ages, for some are younger than the post-ore basalts.

Reserves

In 1970, Silver Standard Mines Limited who, as operator of the BIK Syndicate, were involved in the discovery of the deposit and are partners in the present agreement, announced reserves of 240 million tons of 0.53 per cent copper equivalent. Since then, 21,000 feet of drilling may have augmented the tonnage.

WORK DONE: During the season, 21,342 feet of percussion drilling and 32,575 feet of diamond drilling of NQ size were completed. Line-cutting amounted to some 79 miles, and 8.33 line-miles of induced polarization survey was completed. A survey crew was on the property for a month running location-lines and surveying claim boundaries. The entire property was aerially photographed. Five miles of road was constructed on the BB claims and trenching on the Sno 7, Rum 1, and Rum 4 Fraction amounted to 1,000 feet. Two new buildings, an office and a bunkhouse, were erected on the property and a new 20-kv. generator was installed.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1966, pp. 26–30; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 46.

KINASKAN LAKE

SPECTRUM (No. 43, Fig. B)

LOCATION: Lat. 57°41′ Long. 130°29′ (104G/9W)
At approximately 5,000 feet elevation, 15 miles west-northwest of Kinaskan Lake, 3 miles northwest of Kakiddi Lake.

CLAIMS: SPECTRUM 1 to 4, 7 to 18, 20 to 59.

ACCESS: From Kinaskan Lake by helicopter, 20 miles.

OWNER: Spartan Explorations Ltd.

OPERATOR: MITSUI MINING AND SMELTING COMPANY, LIMITED, 303, 1035 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: A granodiorite to quartz monzonite pluton intrusive into basic volcanics is mineralized with chalcopyrite and molybdenite.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet; ground magnetometer survey; and geochemical soil survey, 266 samples covering Spectrum 1 to 4, 7 to 18, and 20 to 40.

REFERENCE: Assessment Report 2735.

QC (No. 44, Fig. B)

By N. C. Carter

LOCATION: Lat. 57°45′ Long. 130°17′ (104G/9W, 16W)
Between 3,800 and 6,000 feet elevation on the south side of Quash Creek, 8 miles northwest of the north end of Kinaskan Lake.

CLAIMS: QC, totalling 128.

ACCESS: North from Terrace by fixed-wing aircraft, 250 miles.

OWNER: AMOCO CANADA PETROLEUM COMPANY LTD., 2160, 1055 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION:

The QC claims were originally located in 1964 to cover a prominent gossan on the steep, south valley wall of Quash Creek, a deeply incised, northwest-flowing creek which drains the northwest part of the Klastline Plateau. Elevations range from 3,800 feet in the valley bottom to more than 6,000 feet in the southern part of the claim block.

The central part of the claim group is underlain by a north-striking west-dipping homoclinal sequence of iron-stained volcanic and sedimentary rocks which have been intruded by dykes and irregular masses of hornblende feldspar porphyry.

On the north side of Quash Creek, highly contorted sedimentary rocks predominate, suggesting that the creek follows a northwest-striking fault. An east-northeast-striking fault in the southern part of the claim block separates the iron-stained rocks of the central area from massive, grey volcanics of similar trend, but which contain no sulphide minerals.

The volcanic and sedimentary rocks of the central part of the property are predominantly basaltic andesites with interbedded thinly laminated siltstones which are locally calcareous. The volcanic rocks are intensely fractured and brecciated, the numerous fractures being filled with chlorite, epidote, and sulphide minerals.

The dykes and irregular mass of hornblende feldspar porphyry trend east-west and north-south. In contrast to the volcanic and sedimentary rocks which they cut, porphyries are relatively massive and contain less pyrite. A typical specimen is a quartz diorite with 25 per cent of the rock consisting of euhedral 2-millimetre phenocrysts of sericitized plagioclase (oligoclase-andesine) and chloritized hornblende set in a matrix of cryptocrystalline quartz, chloritized biotite, and carbonate. Apatite is a common accessory, with some crystals as large as 0.5 millimetre. Locally the porphyry has a pinkish cast and is a quartz monzonite with abundant perthitic potash feldspar in the fine-grained quartzose matrix. One-eighth to one-quarter-inch wide quartz veinlets, generally barren of sulphides, are fairly common. One variety of intrusive seen was a breccia in which 1-inch rounded fragments of the main intrusive were contained in a fine-grained, dark green porphyritic matrix, indicating that it may represent a later intrusive phase.

The most intense copper and iron-staining is found in brecciated volcanic and sedimentary rocks adjacent to the porphyry dykes. Fine-grained pyrite and chalcopyrite occur most commonly in chloritic fractures in basaltic andesites and to a lesser extent as partial replacements of the mafic minerals in the porphyries.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 400 feet on QC 23 to 48; surface diamond drilling, nine holes totalling 6,395 feet on QC 23, 25, 41, 42, and 44.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1965, p. 41; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 45; Assessment Reports 701, 2237.

GJ (No. 45, Fig. B)

By N. C. Carter

LOCATION: Lat. 57°39′ Long. 130°15′ (104G/9E)

At approximately 5,000 feet elevation, 6 miles west of Kinaskan Lake.

CLAIMS: GJ, totalling 184.

ACCESS: North from Terrace by fixed-wing aircraft, 250 miles.

OWNER: AMOCO CANADA PETROLEUM COMPANY LTD., 2160, 1055 West Hastings Street, Vancouver 1.

METALS: Copper, gold, silver.

DESCRIPTION:

The GJ claims are situated on the Klastline Plateau approximately halfway between Kinaskan and Kakiddi Lakes. The principal showings are situated near the headwaters of what is known locally as Groat Creek, which occupies one of the many steep-sided valleys that dissect the southeastern edge of the plateau.

The property is underlain by Mesozoic volcanic and sedimentary rocks which are intruded by sheet-like bodies of fine-grained granodiorite and quartz monzonite. In the area of the showings a northeast- to north-striking, moderate to steeply west-dipping sequence of volcanic and sedimentary rocks occurs along Groat Creek. Presuming the sequence is right-side-up, the section includes, from south to north, ribbon cherts, quartzites, siltstones, and mudstones, overlain by a partly fragmental rhyolite-dacite unit that is in turn overlain by banded cherts and quartzites. Massive light grey-green crystal lithic tuffs of andesite composition overlie the chert and quartzite unit in the creek and also underlie the west side of the creek valley.

Groat Creek, flowing in a southerly direction near the showings, marks the course of a north-south fault zone. Some difficulty was encountered in tracing sedimentary and volcanic units across the creek and subsidiary east-trending faults were also observed offsetting the lower chert-quartzite unit.

These two fault directions were no doubt instrumental in localizing the intrusion of the sheet-like body of fine-grained granodiorite into the northern part of the sedimentary-volcanic sequence. The intrusive is irregular in form, but may be as much as 600 feet wide. The main phase is a fine-grained grey rock in which sericitized plagioclase (andesine) is contained in a matrix of quartz, carbonate, potash feldspar, and biotite that displays incipient chloritization. Original hornblende is mainly altered to a mixture of carbonate and minor biotite. Magnetite is a common accessory mineral. The granodiorite is cut by widely spaced one-eighth to one-quarter-inch quartz-carbonate and quartz-potash feldspar veinlets. Part of the intrusive mass is a fine-grained pink equigranular quartz monzonite in which the poikilitic potash feldspar may be secondary, for they are relatively unaltered in contrast to the sericitized plagioclase.

Dark green, fine-grained feldspar porphyry dykes, up to 30 feet wide, were noted in the creek and in drill core, cutting sedimentary units.

Intrusion of the granodiorite has resulted in fracturing and quartz veining of the brittle rhyolite-dacite unit bordering the southern contact of the intrusive. A closely spaced stockwork of one-eighth to 1-inch wide quartz veins containing pyrite and chalcopyrite was noted over a 200-foot section in Groat Creek. Several stages of quartz veining are evident, terminated by barren coarse-grained quartz veins up to 1 foot wide. Narrow zones within the rhyolite unit have the appearance of a breccia, with angular one-half to 1-inch rock fragments contained in a quartz matrix.

In contrast to the fractured and veined rhyolite-dacite, the intrusive rocks are massive, and chalcopyrite and pyrite are restricted to relatively widely spaced quartz veinlets.

The 1970 drilling programme consisted of a vertical hole and four angle holes drilled north, east, south, and west, all from the same set-up. The magnitude and timing of movement along the two major fault zones are still imperfectly known, but information from the drill holes suggests a possible westerly plunge for the intrusive mass and bordering mineralized zone in the rhyolite unit.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on GJ 122, 124, 149, and 151; road construction, 10 miles (Kinaskan Lake to GJ 149); surface diamond drilling, five holes totalling 5,020 feet on GJ 149 and 151.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1965, p. 43.

CHRIS (No. 46, Fig. B)

LOCATION: Lat. 57°42′ Long. 129°50′ (104H/13E)
At approximately 5,000 feet elevation, 5 miles south of Ealue Lake.

CLAIMS: CHRIS 1 to 24.

ACCESS: By helicopter from Stewart–Cassiar highway, 7 miles.

OWNER: GREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD., 736 Eighth Avenue SW., Calgary 2, Alta.

METAL: Copper (?).

WORK DONE: Geochemical soil survey covering Chris 1, 2, and 13; bulldozer trenching, 93,000 cubic feet on Chris 9, 11, and 12; surface diamond drilling, two holes totalling 1,015 feet.

GALORE CREEK

CW (No. 47, Fig. B)

LOCATION: Lat. 57°12′ Long. 131°26′ (104G/3W)
At approximately 3,000 feet elevation, near Galore Creek.

CLAIMS: CW, totalling 16.

ACCESS: By helicopter from Kinaskan Lake, 75 miles.

OWNER: AMOCO CANADA PETROLEUM COMPANY LTD., 2160, 1055 West Hastings Street, Vancouver 1.

DESCRIPTION: Pyrite-filled fractures in a quartz monzonite.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on CW 141 to 144; surface diamond drilling, five holes totalling 3,006 feet on CW 141 and 143.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1964, p. 13; 1965, pp. 31, 32; 1966, pp. 25, 26; Assessment Report 937.

SPHALER CREEK

SPHAL, KIM (No. 48, Fig. B)

LOCATION: Lat. 57°02′ Long. 131°18.5′ (104G/3W)
Lat. 57°03′ Long. 131°17.5′
Between 1,700 and 5,000 feet elevation on Sphaler Creek.

CLAIMS: Ten KIM, 34 SPHAL.

ACCESS: By helicopter from Stewart, 120 miles.

OWNERS: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2, and KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730 One Bentall Centre, Vancouver 1.

METAL: Copper.

DESCRIPTION: Disseminated copper in brecciated Triassic volcanic rock and small monzonite porphyry bodies.

WORK DONE: Surface workings mapped in part; surface geological mapping, 1 inch equals 100 feet on Sphal 27; geochemical survey, 100 samples covering Sphal 31; surface diamond drilling, six holes totalling 1,787 feet on Sphal 17 and 27.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1963, p. 8; 1964, p. 17; Assessment Reports 565, 681.

ISKUT RIVER

GREG (No. 49, Fig. B)

LOCATION: Lat. 57°17′ Long. 130°24′ (104G/8W)
At approximately 3,500 feet elevation along Michiko Creek, 2 miles north of Ball Creek (a tributary of Iskut River), 45 miles southwest of Kinaskan Lake.

CLAIMS: GREG 1 to 38.

ACCESS: From Stewart–Cassiar road by helicopter, 10 miles.

OWNER: NEWMONT MINING CORPORATION OF CANADA LIMITED, 1230, 355 Burrard Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Copper, molybdenum, and pyrite mineralization occurs as fracture-fillings and disseminations in an intrusive andesite porphyry.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on Greg 1 to 6, 13 to 20, 25 to 37; magnetometer survey, 2 line-miles covering Greg 1 to 4, 13 to 18; geochemical soil survey, 154 samples covering Greg 1 to 18; geochemical stream sediment survey, 224 samples covering Greg 1 to 38; hand-trenching, 1,000 feet on Greg 3, 5, 15, 16, and 18.

E and L (No. 50, Fig. B)

LOCATION: Lat. 56°35′ Long. 130°42′ (104B/10E)
At approximately 6,000 feet elevation on the south slope of Nickel Mountain at the head of Snippaker Creek, Iskut River area.

CLAIMS: E and L 1 to 41, ELX 1 to 70.

ACCESS: By air from Stewart, 70 miles.

OWNER: Nickel Mountain Mines Ltd.

OPERATOR: SUMITOMO METAL MINING CANADA LTD., 1022, 510 West Hastings Street, Vancouver 2.

METALS: Nickel, copper.

DESCRIPTION: Disseminated pyrrhotite and chalcopyrite with minor pentlandite, pyrite, bornite, ilmenite, and secondary minerals in a small stock of altered coarse-grained gabbro. Pyrrhotite dominates and pentlandite is the primary nickel mineral. Mineralization is localized at the intrusive contact with Lower Jurassic siltstones and apparently decreases inwards toward the centre of the stock.

WORK DONE: Underground workings mapped; surface geological mapping, 1 inch equals 50 feet and 1 inch equals 200 feet and underground geological mapping, 1 inch equals 50 feet on the E and L 1, 7, 9, and 10; magnetometer survey, 7 line-miles covering the E and L 1, 6, 8, and 19 to 24; road construction, 6 miles from Snippaker airstrip to mine portal; underground work, 1,478 feet on E and L 1, 7, 9, and 10; underground diamond drilling, seven holes totalling 2,528 feet on E and L 1.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1965, pp. 43, 44; 1966, pp. 31–34; 1967, p. 30; 1968, p. 41.

MOUNT ALBERT DEASE

WEST (No. 51, Fig. B)

LOCATION: Lat. 57°55.5′ Long. 127°28.7′ (94E/14W)
At approximately 5,000 feet elevation, 13 miles north-northwest of Mount Albert Dease, 150 miles south-southeast of Watson Lake.

CLAIMS: WEST 1 to 14.

ACCESS: By fixed-wing aircraft and helicopter from Watson Lake, 150 miles.

OWNER: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Chalcopyrite found in sheared granite.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet; induced polarization survey, 5.68 line-miles; geochemical survey, 214 samples covering West 3 to 10.

REFERENCE: Assessment Report 2548.

GRAYLING CREEK

BLUE (No. 38, Fig. E)

LOCATION: Lat. 57°58′ Long. 124°05′ (94F/16E)
At approximately 5,000 feet elevation on Grayling Creek, 80 miles southwest of Fort Nelson.

CLAIMS: BLUE, totalling 58.

ACCESS: By helicopter from Fort Nelson, 80 miles.

OPERATOR: McINTYRE PORCUPINE MINES LIMITED, 312, 409 Granville Street, Vancouver 2.

METAL: Copper.

DESCRIPTION: Erratic lenses of chalcopyrite and bornite in dolomite.

WORK DONE: Trenching, approximately 200 feet.

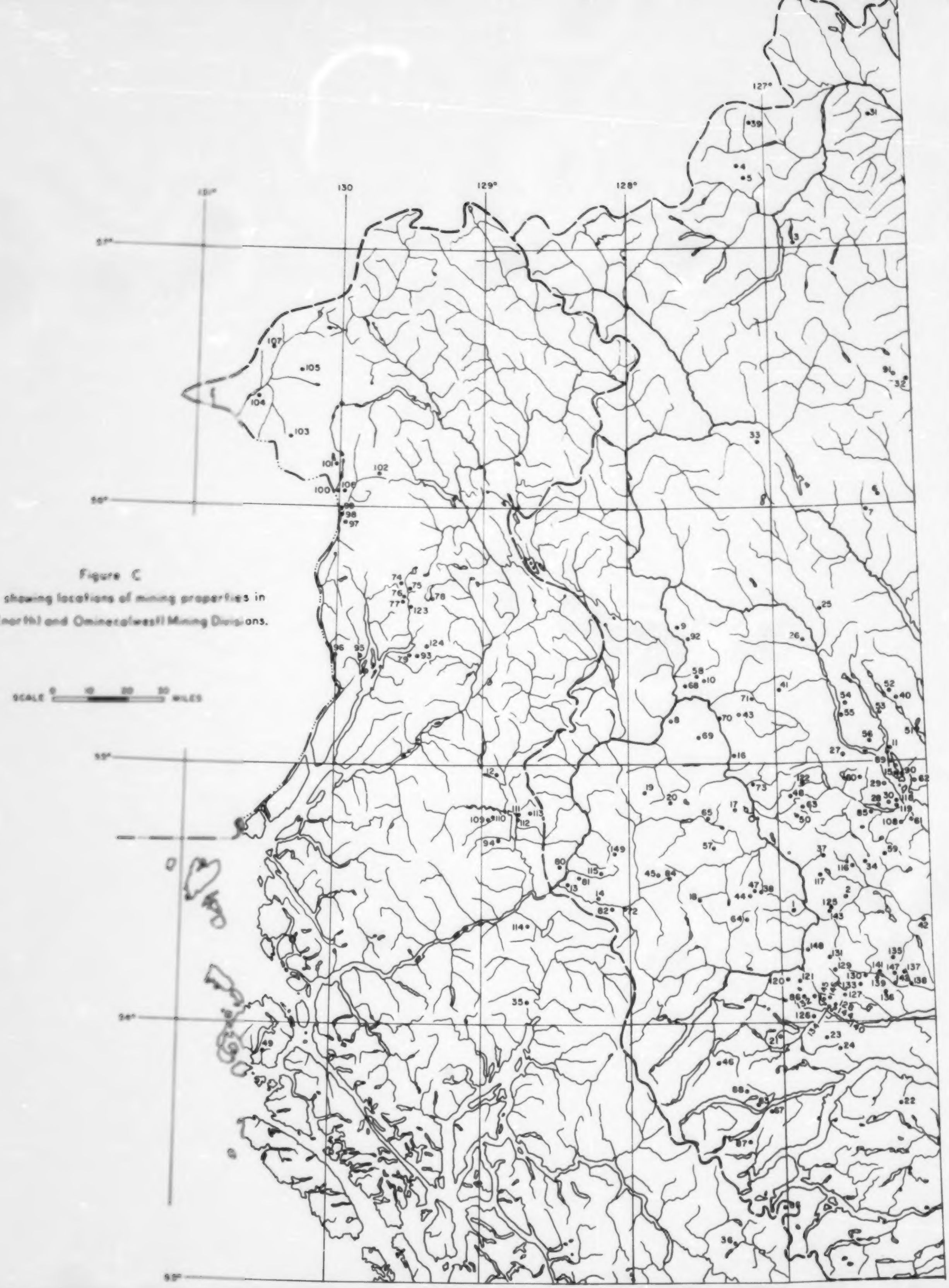

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Figure C

Key map showing locations of mining properties in Skeena (north) and Omineca (west) Mining Divisions.

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SKEENA MINING DIVISION

UNUK RIVER

KAY (No. 107, Fig. C)

By E. W. Grove

LOCATION: Lat. 56°37′ Long. 130°28′ (104B/9W)
Between 3,500 and 3,700 feet elevation, along Eskay Creek on the east slope of Prout Plateau, about 1½ miles east of Tom Mackay Lake.

CLAIMS: KAY 1 to 40.

ACCESS: By helicopter, about 55 miles northwest from Stewart.

OWNER: STIKINE SILVER LTD., 705, 850 West Hastings Street, Vancouver 1.

METALS: Silver, gold, lead, zinc.

DESCRIPTION:

Prout Plateau lies between the headwaters of the southerly flowing Unuk River and the westerly flowing Iskut. Mineralization on the claims was examined under agreement during 1970 by Granduc Mines, Limited. The area was first prospected by T. S. Mackay and party in 1932. The Premier Gold Mining Company, Limited explored the ground extensively in 1935 and 1936 by open cuts and diamond drilling. In 1939, Mackay Gold Mines, Limited drove an adit near the south end of the claim group (*see* Ann. Rept., 1953, p. 88), which was extended for a total length of 360 feet by Canadian Exploration Limited in 1946. In 1963 a crosscut adit was driven on the Bluff zone near the north end of the property from which Canex Aerial Exploration Ltd. tested the mineralized area with six diamond-drill holes. In 1965, Stikine Silver Ltd. extended the adit to a length of 586 feet, and performed considerable surface exploration.

The Kay claim group has been located along part of an extensively altered and weakly mineralized area which stretches from Sam Coulter Creek on the south end of Prout Plateau to Olie Creek on the northeast. West of the property the country rocks are weakly sheared, fossiliferous Middle Jurassic siltstones, greywackes, and conglomerates. These deformed sediments lie in a re-entrant trough that extends southward from the main Bowser Basin. A similar trough extends southerly along Storie Creek into the Unuk River, which bounds the eastern side of Prout Plateau. Prout Plateau itself is underlain largely by green, well-bedded volcanic sandstones, conglomerates, breccias, and lenticular pillow volcanic units. These rocks are part of a well-exposed Lower Jurassic sequence which dips easterly into the successor Bowser Basin. Much of the Prout Plateau has previously been shown on maps to be underlain by intrusive granitic rocks (*Geol. Surv., Canada,* Map 9-1957). Battleship Knoll, which lies to the southeast of the Mackay adit (south end of claim group), as well as several other small ridges which form reddish weathering bluffs along the crest of Prout Plateau, consist of metasomatized volcanic conglomerates. Silicification and pyritization predominate with sporadic potash metasomatism. Small granitic intrusive plutons are found in the triangle formed by the junction of Sam Coulter Creek and the Unuk River. Several small diatreme pipes associated with basaltic pillow volcanics are located west of the Kay property just south of Tom Mackay Lake where the diatremes intrude and overlie Bowser siltstones. On the claim group about 40 trenches, pits, and cuts and two underground workings expose altered and mineralized volcanic breccia, deformed quartz boulder conglomerates, and sheared volcanic conglomerates and siltstones that form part of the northeasterly trending, east dipping, Lower Jurassic succession. These units are individually lenticular and are extensively deformed in the Eskay Creek shear zone, which trends northeasterly across Prout Plateau.

Mineralization found in the volcanic breccias, siltstones, and quartz boulder conglomerates generally consists of quartz stockworks with irregular gold- and silver-bearing sulphides. Vuggy quartz veinlets fill narrow, irregular fractures in the country rocks and form the small stockworks in which erratic sulphide-rich veinlets are localized. The metallic minerals recognized include chalcopyrite, tetrahedrite, arsenopyrite, galena, and sphalerite, as well as ubiquitous pyrite. Gold and silver values are variable and generally low. The main sulphide zone (No. 5 area) explored in surface trenches by the early work has been explored underground by the crosscut adit started in 1963.

WORK DONE: Geophysical and geochemical surveys.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1953, pp. 87, 89; 1963, p. 10; 1964, p. 20; 1965, p. 44.

TED, RAY (No. 105, Fig. C)

By E. W. Grove

LOCATION: Lat. 56°32′ Long. 130°15′ (104B/9E, 9W)
About 20 miles north of the Granduc mine, on the east side of the Unuk River.

CLAIMS: TED, RAY, RAN, PATTY, ARBEE, JOHN BULL, DAWSON-ROSS groups, comprising 78 recorded claims.

ACCESS: By helicopter, about 40 miles north-northwest from Stewart.

OWNERS: Granduc Mines, Limited and Don Ross and Associates, of Ketchikan, Alaska.

OPERATOR: GRANDUC MINES, LIMITED, 2009, 1177 West Hastings Street, Vancouver 1.

METALS: Copper, molybdenum.

WORK DONE: Topographic and detailed geological surveys initiated in 1968 on the claim block were completed during 1970. Work was concentrated along the Mitchell Glacier between the toe area and the Bruce-Jack Snowfield to the east. Topographic map, scale 1 inch equals 200 feet, and geological mapping, scale 1 inch equals 200 feet, on the Ray 1 to 8, John Bull 19 to 24, and Ran 7 to 14.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 45, 46.

MAX (No. 104, Fig. C)

By E. W. Grove

LOCATION: Lat. 56°25′ Long. 130°32′ (104B/7E)
The west side of McQuillan Ridge, above Barclay Gulch, between elevations 1,500 and 5,000 feet.

CLAIMS: DAN 1 to 22, JIM 1 to 22.

ACCESS: From Stewart, 50 miles to the southwest.

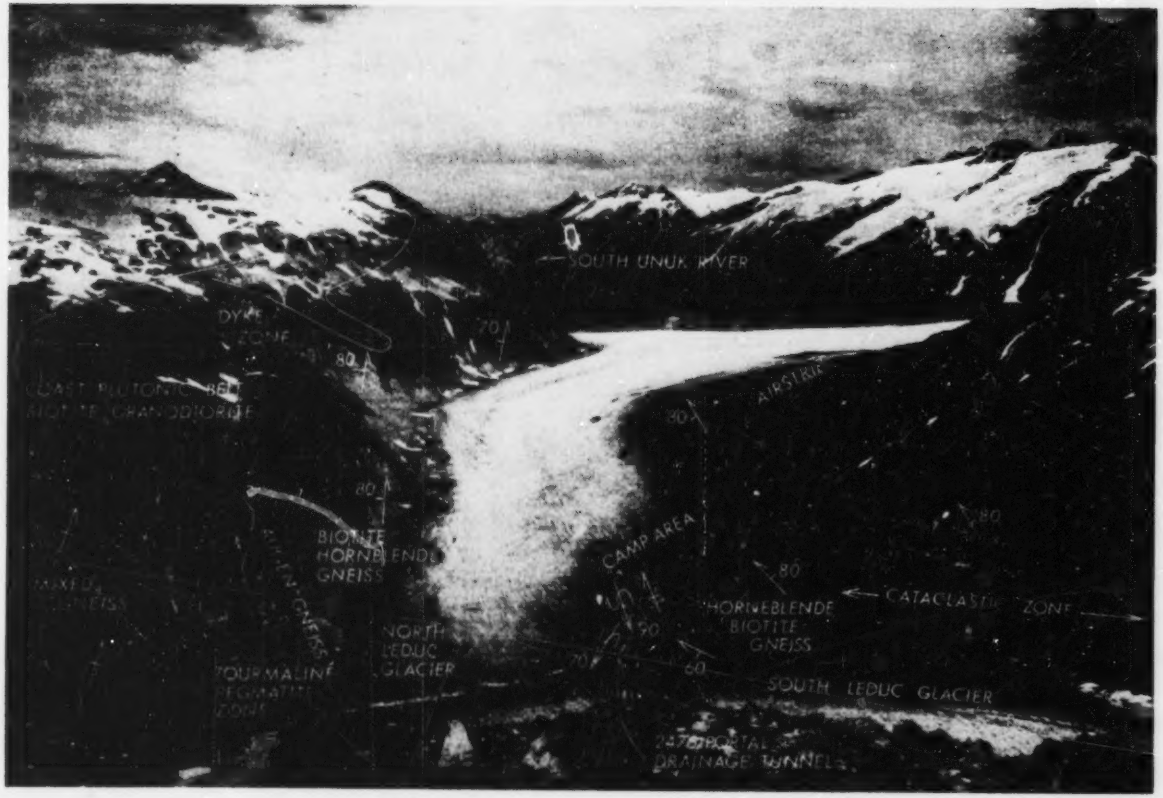
OWNER: GRANDUC MINES, LIMITED, 2009, 1177 West Hastings Street, Vancouver 1.

METALS: Copper, iron.

DESCRIPTION: Mapping and geophysical work was completed as a follow-up to airborne geophysical surveys. An airborne magnetic anomaly previously outlined on the Dan claims was shown by detailed ground work to be a mass effect related to a northwesterly trending swarm of dioritic dykes cutting weakly indurated and altered volcanic conglomerates, breccias, and limestones.

WORK DONE: Line-cutting, detailed ground magnetometer survey, and detailed geological mapping on the Dan 1 to 22 claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 54.


SOUTH UNUK RIVER
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80
COAST PLUTONIC BELT
BIOTITE GRANODIORITE
AIRSTRIP
30
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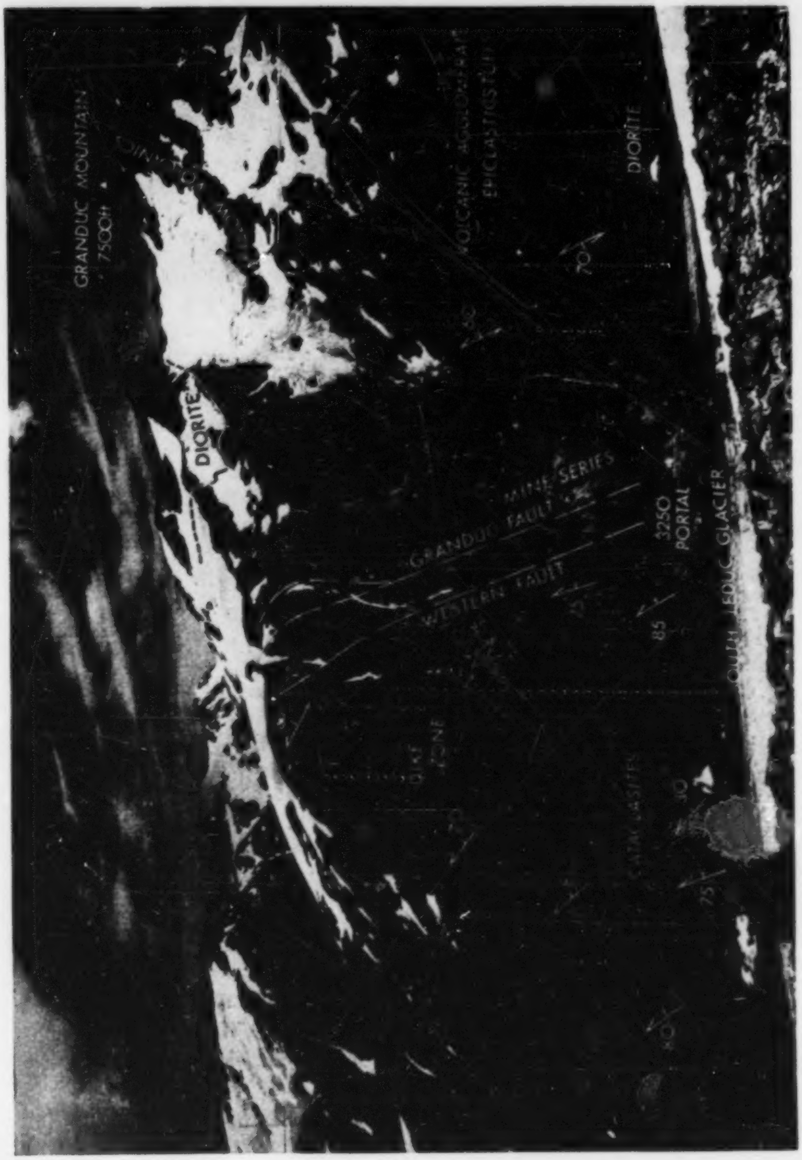
BIOTITE
HORNBLENDE
GNEISS
AUGEN GNEISS
MIXED
GNEISS
CAMP AREA
80
80
HORNBLENDE
BIOTITE
GNEISS
CATACLASTIC ZONE
90
70
60
NORTH
LEDUC
GLACIER
TOURMALINE
PEGMATITE
ZONE
SOUTH LEDUC GLACIER
2476 PORTAL
DRAINAGE TUNNEL

Plate I.—Granduc mine area, looking north.


GRANDUC MOUNTAIN
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DIORITE
VOLCANIC AGGLOMERATE
EPICLASTICS TUFF
DIORITE
70
80
MINE SERIES
GRANDUC FAULT
3250
PORTAL
WESTERN FAULT
85
75
DIKE
ZONE
CATACLASITES
30
75
80
SOUTH LEDUC GLACIER

Plate II.—Granduc mine area, looking north.

TIDE LAKE FLATS

GRANDUC MINE (No. 103, Fig. C)

By B. M. Dudas and E. W. Grove

Location: Lat. 56°13′ Long. 130°21′ (104B/1W)
The mine is at the head of the Leduc River, 25 miles north-northwest of Stewart, between elevations 1,800 and 4,000 feet. The concentrator and campsite are at Tide Lake. The townsite is at Stewart.

Claims: One hundred and sixty-four Crown-granted and 186 recorded mineral claims.

Access: Thirty-one miles by road from Stewart, through Hyder, Alaska, to the Tide Lake camp and concentrator, then by an 11.6-mile tunnel to the mine.

Owner: Granduc Mines, Limited.

Operator: GRANDUC OPERATING COMPANY, 520, 890 West Pender Street, Vancouver 1; mine address, Box 69, Stewart.

Metals: Copper, silver (*see* Table 1 for production).

Description:

History

The Granduc mine represents one of the very few mineral deposits in the Stewart Complex which was not located prior to 1930. Dawson and Fromholz prospected the Granduc Mountain area in 1931, but located their claims on minor mineralization about 3 miles from the minesite. In 1948, Einar Kvale prospected the Leduc area and examined most of the known mineral showings. He returned to the Leduc area in 1951 and staked the main Granduc surface showing which had just been exposed by rapid melting of the South Leduc Glacier. This had not been seen in 1948 and was obviously buried under deep ice in 1931. The upper showings were also covered by the snowfield and a small hanging glacier at that time.

General Geology

The Granduc ore deposit lies about 3 miles east of a conspicuous re-entrant in the main easterly contact of the Coast Plutonic Complex. The country rocks west of the mine and North Leduc Glacier include mainly mixed biotite-hornblende and hornblende gneisses. Tourmaline-bearing pegmatites and hornblende diorite dykes form conspicuous subparallel zones in the steep-dipping, northerly trending gneisses which extend north about 6 miles into the South Unuk River area. The country rocks east of the North Leduc Glacier on Granduc Mountain (*see* Plates I and II), including the mine series, appear to be part of the mixed gneiss succession which is overlain on the east by easterly dipping volcanic conglomerates, thick pillow volcanic units, and minor intercalated sediments. On Granduc Mountain, a number of deformed, recrystallized limestone lenses which form distinctive units along the east side of the North Leduc Glacier and in the mine series have been traced north along the South Unuk River. In the South Unuk section these rocks are less deformed and have been dated by fossil assemblages collected by the writer and identified by W. R. Danner at the University of British Columbia as Lower Jurassic.

Small plutons and dykes are abundant in the Granduc Mountain section, as well as in the Unuk River area in general. These various intrusive rocks have been dated by field relationships as Upper Triassic, Lower and Middle Jurassic, and Tertiary. The main Coast Plutonic Complex, which cuts northwesterly across the general area, has been dated as Tertiary. The various dykes and plutons found at Granduc Mountain form part of a wide zone of Skeena plutons (*see* Ann. Rept., 1968, pp. 42–45) localized along the margin of the Bowser Basin. The Tertiary

Plate IIIA.—Granduc area. Deformed limestone with gneiss boudins as inclusions.

Plate IIIB.—Granduc drainage tunnel area. Apatite-magnetite rich deformed gneiss.

quartz diorite dykes which cut northwesterly across Granduc Mountain form part of an *en echelon* group of dyke swarms that extend southward from the Unuk River to Alice Arm. Older granodiorite and diorite dykes are recognized at Granduc Mountain and in the ore zone, but have not been dated with certainty.

Local Geology

The geology of Granduc Mountain has been exposed for detailed study by the development workings in the narrow ore zone, by the 2475-level drainage tunnel which extends from the portal near the intersection of the North and South Leduc Glaciers to the mine, and by the main haulage tunnel which extends from the mine 11.6 miles east to the Tide Lake concentrator site. Surface exposures are generally excellent along the margins of the glaciers, but the essentially perpetual snow cover on Granduc Mountain, as well as extensive morainal debris, leave bare only limited outcrop for such a geologically complex area.

The junction of the North and South Leduc Glaciers, near the surface camp, crudely marks the local boundary between the mixed gneiss zone on the west and the complex, deformed tactite (gneiss) cataclasite zone which essentially comprises the west half of Granduc Mountain. The east half of the mountain consists largely of epiclastic and pillowed volcanic rocks with minor intercalated sedimentary rocks, which are all variably indurated and altered, but relatively undeformed compared to the cataclasite section.

The cataclasite zone, including the mine series, comprises an assemblage of mylonites, phyllonites, and irregular lenses of less-deformed limestone, hornblende gneiss, tactite, as well as recognizable sedimentary units. Deformational structures, although complex in detail, essentially parallel the steep northerly trending gneisses to the west of the glacier. In detail the various country rock units have been subjected to extensive refolding, stretching, and boudinage. Limestone units found

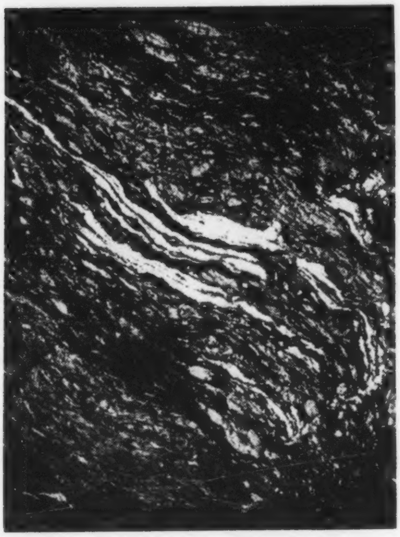

Plate IVA.—Granduc area. Mylonitized skarn showing hartschiefer texture, mine series. (Field 0.4 cm.)

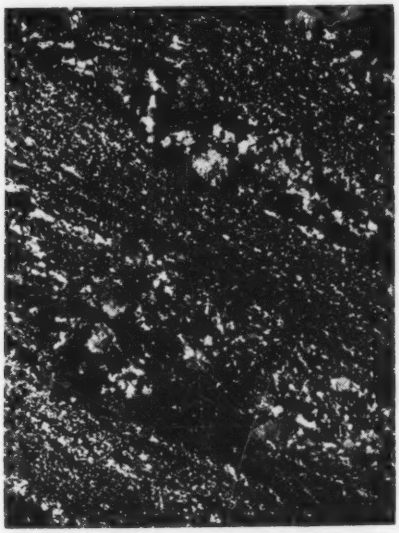

Plate IVB.—Granduc area. Phyllonite with epidote (high relief) and tourmaline (mottled), mine series. (Field 0.4 cm.)

along the east side of the North Leduc Glacier and in the mine section are illustrative of the extent of local deformation. Plate IIIA shows one 20-foot-thick refolded recrystallized limestone unit, in which boudins of country rock hornblende gneiss have been transported, rotated, and protected from the cataclasis which produced mylonites in the surrounding medium. In general, the simple biotite or biotite-hornblende gneiss country rocks have been converted to mylonites or phyllonites. Banding, distinguished in thin-section by hartschiefer texture* (Plate IVA), dominates the texture of these rocks. At outcrop scale most of these fine-grained, colour-banded cataclasites resemble simple bedded sedimentary units.

Mylonitized tactite found as irregular banded units is common throughout the Granduc Mountain cataclasite zone. These rocks are normally thinly colour-banded and exhibit mylonite texture. They consist of alternating bands dominated by clastic diopside, epidote, quartz, feldspar with variable apatite and magnetite, and commonly have a recrystallized calcite matrix. In the ore zone, clastic tourmaline (Plate IVB) is found in both wallrock mylonite-phyllonite and sulphides as well as in deformed tactite material. Banded quartzose biotite phyllonites and quartzites intercalated within the ore zone are seen in thin-section to consist of flattened, elongated quartz pebbles with ultra-mylonitic matrix. The main quartzite exposed in the mine workings has tentatively been correlated with quartz-boulder conglomerates traced to the north from Granduc Mountain.

Mineralization

The ore, consisting mainly of simple sulphides and oxides, is apparently confined to a lenticular 400 to 800-foot-wide zone within the tactite-gneiss sequence that has a steep dip and northerly trend. This narrow section is marked by an apparent relative abundance of deformed marble. The ore lenses appear from diamond drilling and underground development to be pancake-like overlapping bodies which are known to extend vertically from about 1,500 feet elevation to 4,000 feet elevation and laterally at least 4,000 feet. As designated, the "A" orebody lies along the west limit of the zone and extends from depth at the south to the central mine section. The "B" orebody lies on the eastern limits in the main central mine section. "C" zone lies between "A" and "B" and joins "F" zone, which extends to the northern known limit. "Ch" zone is an upper part of the main "C" orebody where development is now under way. In detail the individual orebodies consist of streaks, blebs, blobs, and irregular massive lenses of sulphide of rapidly changing outline within phyllonite-mylonite. Breccia-like textures in the massive sulphides, rotated blocks of mylonite in the ore, as well as abundant evidence of sulphide remobilization as veins indicate extensive and pervasive ore deformation at several periods. The widespread cataclasis that has deformed the ore, tactite, and gneiss leaves the timing of metasomatism and ore formation open to question and the genesis of the ore to hypothesis. The use of the term "stringer-lode" to describe the orebodies indicates the irregular, feathery nature of the ore boundaries probably produced during the main period of cataclastic deformation.

The ore minerals include pyrite, chalcopyrite, pyrrhotite, and sphalerite in order of relative abundance. Arsenopyrite has been noted in several shoots, cobaltite described in the upper part of the "A" zone, galena in the "A," "Ch," and "C" zones, and magnetite appears to be common but apparently concentrated along the western ore limit. Gangue consists essentially of quartz with country rock.

A number of extensive steep northerly trending faults have been identified cutting orebodies as well as crosscutting Tertiary and older dykes (*see* Norman and

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* Compact felsite-like rocks characterized by well-developed, thinly banded structure. Neo-mineralization variable.

McCue, 1966). The Western and Granduc graphitic fault zones are west of the ore zone and are expressed on the surface by lineaments which transgress the lower west slope of Granduc Mountain. Several of the orebodies have been offset by apparent right-hand strike-slip movement, and in the north mine sector different orebodies have been faulted into juxtaposition. The over-all significance of faulting has not yet been thoroughly examined in terms of total movement and ore control.

A preliminary examination of the ore and wallrocks has revealed no obvious alteration halo or simple mineralogical guide to orebodies within the mylonite-phyllonite sequence. Tourmaline (Plate IVB) is found as clasts both within remobilized recrystallized ore as well as in mylonitized skarns outside the mine series. Incipient biotite in the phyllonites within the mine series represents dynamically induced recrystallization common to the cataclasite zone. Magnetite-apatite (up to 50 per cent of the rock) rich cataclasites are ubiquitous within the cataclasite zone and in certain rock units (Plate IIIB) may represent recrystallized sedimentary materials. Extensive cataclasis of the country rocks and ore has certainly obscured many primary relationships but has not completely obliterated the mineralogy.

Recent estimates released by the company place the Granduc ore reserves at 43,343,000 tons grading 1.73 per cent copper. Work is continuing on the delineation of the complex orebody outlines.

WORK DONE:

Mine

The ramp between the 2600 and 3100 levels and the continuation to the top of the orebodies was completed during the early part of 1970. This ramp provides the primary access for material, equipment, and supplies from the Tide Lake tunnel level to the top of the orebodies in Block 1. The orebodies in Block 1 are known as the "A," "C," "Ch," "B_1," and "B_2."

The development of this block was carried out at 30-foot sublevel intervals from the 3720 level down to the 3290 level to prepare this area for transverse sublevel caving. The "A" and the "Ch" orebodies have been started as sublevel open stopes; these orebodies are developed at 60-foot sublevel intervals. The ore was dumped down the 113 ore pass to the 2600 level where it was retrammed to a surface stockpile during the preproduction phase, but subsequently trammed to the crusher dump in the 2600 gathering haulage. Waste was dumped down the 109 waste pass to the 3100 level, where it was retrammed outside at this horizon to the Leduc side.

Mine facilities were completed on the 2600 level. These included the underground compressor room, in which two C.I.R.-XLE units and two Atlas Copco ER8 units are housed and operating; the underground crusher room with one 42 by 48-inch jaw crusher; the conveyorway and ore-waste loading bins; an ore dump for Hudson Rock Flo cars and underground mobile equipment repair shops.

There were two 7-foot-diameter raises bored with raise borers during the year. One is to serve as fresh air intake for the compressor room and 2600 level shop area, and the other as an exhaust and drainage between the 3100 and 2475 levels.

The Catenary system in the 2600-level tunnel was completed, and transportation of personnel and supplies with the Mitsubishi 40-ton electric locomotives started in March. The design capacity of the 2600-level haulage system is 1,000 tons per train load at an average speed of 25 miles per hour.

Surface

The Leduc camp has been vacated and was closed in October. Now all personnel either reside at Tide Lake or commute from Stewart daily. Regular bus service is provided by the company from Stewart to Tide Lake.

The crushing plant, mill, and loading and docking facilities at Stewart were completed. The concentrator was started up at a nominal rate of 2,000 tons per day on November 1, 1970, and continuous operation was maintained on a tune-up basis.

Development and Personnel

Total underground development was 40,146 feet; drifts and crosscuts for trackless-type equipment, 30,741 feet; drifts and crosscuts for track-type equipment, 3,050 feet; raising with Alimak, 2,284 feet; slot raising at end of production headings, 2,661 feet; and raise boring, 1,410 feet. In addition, excavation for shops, crusher installations, conveyorways, and load-out bins amounted to 615,037 cubic feet.

Total manpower at December 31 was 767, distributed as follows: Staff and clerical help, 169; hourly employees on surface, 201; hourly employees underground, 314; contractors on surface, 42; and contractors underground, 41.

Surface and underground diamond drilling was continued under contract for the total footage of 68,273 feet. Surface diamond drilling was carried out by Inspiration Diamond Drilling during the summer months and amounted to 5,250 feet. Underground diamond drilling was contracted to Haste Mine Development Company Ltd. for the total of 63,023 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1964, pp. 18–20; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 54–56; Norman, G. W. H., and McCue, J., 1966, Relation of Ore to Fold Patterns at Granduc, B.C., *C.I.M.M.*, Spec. Vol. No. 8.

STEWART

BIG MISSOURI (No. 101, Fig. C)

LOCATION: Lat. 56°06′ Long. 130°02′ (104B/1E)
At approximately 3,000 feet elevation on Big Missouri Ridge, about 4 miles north of the Premier mine.

CLAIMS: Stewart-Wikstrom group consists of Mineral Leases M-51, M-52, M-118.

ACCESS: By road from Stewart, 15 miles.

OPERATOR: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METALS: Copper, lead, zinc, silver, gold.

DESCRIPTION: Sulphide-bearing quartz veins, lenses, and stockworks localized by minor fold structures within altered tuffaceous medium-grained volcanic epiclastic rocks of Lower Jurassic age. Ore minerals include native gold, galena, sphalerite, chalcopyrite, and pyrite.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 100 feet on Mineral Leases M-51 and M-52; geochemical soil survey, 715 samples on M-51 and 592 samples on M-52.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 40; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 57.

SILBAK PREMIER MINE (No. 100, Fig. C)

LOCATION: Lat. 56°02′ Long. 130°01′ (104B/1E)
Between 700 and 2,500 feet elevation on the west slope of Bear River Ridge, about one-half mile north of the Alaska-British Columbia Boundary, Stewart area.

CLAIMS: Eighty-seven Crown-granted claims, including the key CASCADE FALLS 4, 8.

ACCESS: By road from Stewart, 16 miles.

OWNER: Silbak Premier Mines Limited.

OPERATOR: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

METALS: Gold, silver, lead, zinc, copper, cadmium.

DESCRIPTION: Transgressive vein-breccia-replacement quartz-polymetallic sulphide deposit emplaced in deformed, metasomatized Lower Jurassic epiclastic rocks.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on Lower 70-ODD; induced polarization survey, 45 line-miles on Lower 70-ODD; trenching, 60 feet on Cascade Falls 8.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1964, pp. 21, 22; 1965, p. 49; 1966, p. 39; 1967, p. 34; 1968, p. 59; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 56.

MC (No. 106, Fig. C)

LOCATION: Lat. 56°02′ Long. 129°58′ (104A/4W)
Seven miles north of Stewart, between elevations 3,000 and 5,200 feet along the ridge south of Mount Shorty Stevenson.

CLAIMS: Mineral Lease M-224; MACK No. 2 Fraction (Lot 1809), MACK No. 3 Fraction (Lot 1810), JEAN (Lot 4196), MC (Lot 4406), MC No. 1 (Lot 4407), MC No. 1 Fraction (Lot 4409), ANNIVERSARY (Lot 4410), BONANZA (Lot 4411), PEERLESS Nos. 2 to 6 (Lots 4587 to 4591), PEERLESS Fraction (Lot 4592), PEER Fraction (Lot 4593); located claims: RIDGE 1 to 4, VAL 1 to 6, VAL 1 Fraction, YOUNG Fraction.

ACCESS: From Stewart by helicopter, or via the old pack trail from Premier.

OWNER: MARLEX MINING CORPORATION LTD., 1700, 777 Hornby Street, Vancouver 1.

METALS: Gold, silver, lead, zinc.

DESCRIPTION: Soil-sampling outlined scattered highs which do not correlate to the magnetometer results. Scattered mineralization was located during surveys.

WORK DONE: Camp established; 10-mile picket-line grid on Mineral Lease M-224; 417 soil samples analysed for lead-zinc; 10 soil samples analysed for silver; Fluxgate magnetometer survey of Mineral Lease M-224.

REFERENCE: Assessment Report 2754.

ROOSEVELT (No. 102, Fig. C)

By B. M. Dudas and E. W. Grove

LOCATION: Lat. 56°02′ Long. 129°47′ (104A/4W)
Ten miles northeast of Stewart on Bitter Creek.

CLAIMS: Thirty Crown-granted (MORGAN, LEAD COIL, ALBERTA, CREEK, RADIO, ORE HILL, MILLER, PONTIAC, ROOSEVELT, NORTHERN BELL, MAYOU) mineral claims and 11 located TERRY claims. SANDY (Lot 5589) is now Mineral Lease M-147.

Access: By four-wheel-drive vehicle from the Stewart–Cassiar highway, following Bitter Creek, or by helicopter from Stewart.

Owners: CREST SILVER COMPANY LIMITED (wholly owned subsidiary of Crest Ventures Limited) and ARDO MINES LTD. (by agreement), 630, 890 West Pender Street, Vancouver 1.

Metals: Copper, gold, silver, lead, zinc.

Description:

Current holdings by Crest Silver Company Limited on Bitter Creek include the old Roosevelt, Radio-Stewart, and Mayou gold-copper properties which were active between 1900 and 1930. The Roosevelt showings are on the north fork (Roosevelt Creek) of Bitter Creek, about 1 mile from the stream junction, above elevation 1,200 feet. The Radio-Stewart workings are along Radio Creek, which enters Bitter Creek west of the north fork between elevations 900 to 5,000 feet. The Mayou showings are north of the Radio-Stewart and Roosevelt claims, above 5,000 feet elevation.

The mineral deposits are quartz-breccia veins with erratic sulphide lenses, narrow sulphide-rich veins, and transitional replacement zones. Sulphide minerals are pyrite, chalcopyrite, galena, and sphalerite, which contain erratic gold-silver values. The veins are localized in Middle Jurassic siltstones cut by members of the extensive Tertiary Portland Canal dyke swarm.

Work done:

General prospecting was carried out during 1970 under the direction of Primac Exploration Services Ltd. About 5 line-miles of magnetometer survey with a MF-1 Fluxgate magnetometer and a Turam electromagnetic survey on the same grid were completed. Three shallow exploration drill holes (total of 130 feet) with a "Winkie" diamond drill were drilled from the surface to test mineralized veins.

In addition, the old "Silver Tunnel" at the confluence of the Roosevelt and Ardo Creeks was widened to 6 feet and extended another 15 feet to a total length of 250 feet. From the end of this adit, three diamond-drill holes of BQ size were drilled.

ASU No. 1 at minus 85 degrees to a depth of 36 feet.
ASU No. 2 at minus 28 degrees to a depth of 78 feet.
ASU No. 3 at minus 10 degrees to a depth of 705 feet. (End of hole is at minus 30 degrees.)

References: *Minister of Mines, B.C.*, Ann. Repts., 1910, p. K 78; 1928, pp. C 102, C 103; 1929, p. C 97; 1967, p. 34.

PRINCE JOHN (No. 99, Fig. C)

Location: Lat. 55°59.5′ Long. 129°58.5′ (103P/13W)
Between 2,000 and 2,300 feet elevation, on the west side of Bear River, 3½ miles north of Stewart.

Claims: Mineral Leases M-240, M-251, which include 16 Crown-granted claims and fractions.

Access: By helicopter from Stewart, 3 miles.

Owner: ECHO BAY MINING LTD., 1555, 777 Hornby Street, Vancouver 1.

Metals: Copper, gold.

Description: Vein and replacement quartz-pyrite-chalcopyrite mineralization apparently confined to deformed (schistose) volcanic epiclastics. The shear zone has been explored by two crosscut adits at elevations 2,062 feet and 2,210 feet below surface showings at 2,235 feet. The mineralized zone, up to 40 feet wide, appears to abut against a granodiorite dyke on the west in the upper adit and was not encountered in the lower adit.

WORK DONE: Surface and underground geological mapping, 1 inch equals 40 feet on Prince John; trenching, 200 feet on Prince John; underground work, rehabilitation of existing 700-foot tunnel.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1923, pp. 76, 77; *Geol. Surv., Canada,* Mem. 175.

GOLD CLIFF (No. 98, Fig. C)

LOCATION: Lat. 55°57′ Long. 129°57′ (103P/13W)
At approximately 2,900 feet elevation on the east slope of Bear River Ridge, 2½ miles north of Stewart.

CLAIMS: GOLD CLIFF 1 to 6, GOLD CLIFF 1 to 3 Fractions, JERRY DOG, BARNEY, TOM.

ACCESS: By helicopter from Stewart, 2½ miles.

OWNER: ATHENA MINES LTD., 307, 543 Granville Street, Vancouver 2.

METALS: Gold, silver, lead, zinc.

DESCRIPTION: Dominantly replacement-type pyritic mineralization localized within northwesterly trending fracture zones in volcanic epiclastic rocks at or near the contact of the Hyder quartz monzonite pluton. Three main mineralized zones have been explored by surface cuts and by extensive underground development. Minerals recognized include pyrite, followed by arsenopyrite, galena, sphalerite, and minor tetrahedrite. Quartz is ubiquitous but not abundant.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on Gold Cliff 1, 4, and 5; surface work, two trenches totalling 200 cubic feet on Gold Cliff 4; surface diamond drilling, three holes totalling 414 feet on Gold Cliff 4.

REFERENCE: Assessment Report 2386.

SILVERADO, PROSPERITY-PORTER IDAHO (No. 97, Fig. C) By E. W. Grove

LOCATION: Lat. 55°54.5′ Long. 129°56′ (103P/13W)
On Mount Rainey, immediately southeast of Stewart, on the east side of Portland Canal.

CLAIMS: Ninety-nine Crown-granted claims which include the three inoperative mines.

ACCESS: From Stewart by helicopter, about 1½ miles.

OWNER: CASSIAR CONSOLIDATED MINES LTD., 610 Jervis Street, Vancouver 5.

METALS: Silver, lead, zinc.

DESCRIPTION: Development work by the Premier Gold Mining Company Ltd. prior to the mine shut-down in 1936, in the 3E stope area, indicated the presence of several high-grade, narrow oreshoots between 3 level at 5,100 feet elevation and the surface at about 5,350 feet elevation. The vein in the 3E sector averages about 1 foot wide and has been shown to be continuous. The oreshoots are steeply dipping pipe-like sulphide-rich (argentite) lenses with steep northerly plunge. Premier sampling in the 3E Nos. 4 and 5 subraises outlined mineralization which averaged about 0.01 ounce per ton gold and 205 ounces per ton silver across 1 foot. Company reports indicated that grab samples taken in the 3E sector returned at best 0.72 ounce per ton gold, 865.2 ounces per ton silver, 19.45 per cent lead, and 1.8 per cent zinc across 4 feet near the end of 304D south.

Work done: Rehabilitation of the 3 level drift in the Prosperity-Porter Idaho sector with sampling of old raises in the 3E stope area. The remaining 50-foot I5 north drift connection to I2D south to provide access was completed.

References: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 41; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 58.

MAPLE BAY

MAPLE BAY COPPER MINE (No. 96, Fig. C)

By E. W. Grove

Location: Lat. 55°25′ Long. 130°00′ (103P/5W, 103O/8E)
At approximately 2,000 feet elevation, in the Portland Canal area, 35 miles south of Stewart.

Claims: Eagle-May Queen group, comprising 15 Crown-granted claims and 10 located claims held by option.

Access: Thirty-five miles south by aircraft or boat from Stewart.

Operator: GREAT SLAVE MINES LTD., 100, 890 West Pender Street, Vancouver 1.

Metal: Copper.

Description:

The Maple Bay property lies on the steep, west-facing slope of the Burniston Range, overlooking Maple Bay and the Portland Canal. The old smelter town of Anyox lies only 7 miles due east on the opposite side of this narrow peninsula.

Great Slave Mines Ltd. currently holds the Eagle-May Queen group of 15 Crown-granted claims under option from Maple Bay Copper Mines Ltd., plus the OS 1 to 18 located claims and fractions. During late 1969 the operating company drifted and tested the Princess vein for 435 feet from the 2,400-foot elevation adit. In 1970 the depth continuity of the vein system was tested by driving a 1,515-foot long crosscut from elevation 1,875 feet to intersect both the Anaconda and Princess veins. Oscar Nukka managed the project.

The Princess vein is one of at least 15 quartz-chalcopyrite-pyrrhotite-pyrite veins that have been developed in the immediate Maple Bay area. Mineralization was first located there in 1902 by Messrs. Noble, Collinson, and Flewin and development was initiated in 1904. In 1905 the property was bonded to the Brown-Alaska Company of Hadley, Alaska, and then to the Sir Donald Mann interests in 1906. Work on the adjacent Outsider group led to production from the successful Outsider mine, which shut down in 1927. Development on the Eagle, Anaconda, Princess, and other veins on the Maple Bay property since 1906 has been sporadic and has been limited to surface trenching, minor drifting, and some diamond drilling. The most intensive programme of drilling and testing was on the Eagle vein in 1923 by The Granby Consolidated Mining, Smelting and Power Company Limited. The results on the Eagle vein based on surface exposures and four drill holes indicated a probable tonnage of 522,000 tons at 1.71 per cent copper and an inferred tonnage of 590,000 tons at 1.4 per cent copper. Economic conditions at the time forced abandonment in 1924, and the property has been essentially inactive up to 1969.

The general geology of the Maple Bay-Anyox area, as well as the detailed geology of the numerous mineral deposits, have been revised by the writer. The old geological maps and reports are of considerable historic interest. Country rocks in the Maple Bay area include pillow volcanics, limestones (marble), siltstones, layered andesitic volcanics, and sill-like hornblendites. These rocks form an easterly dipping sequence which is dominantly volcanic and which is overlain in the Anyox section by marine Bowser siltstones. Lithologic and structural continuity

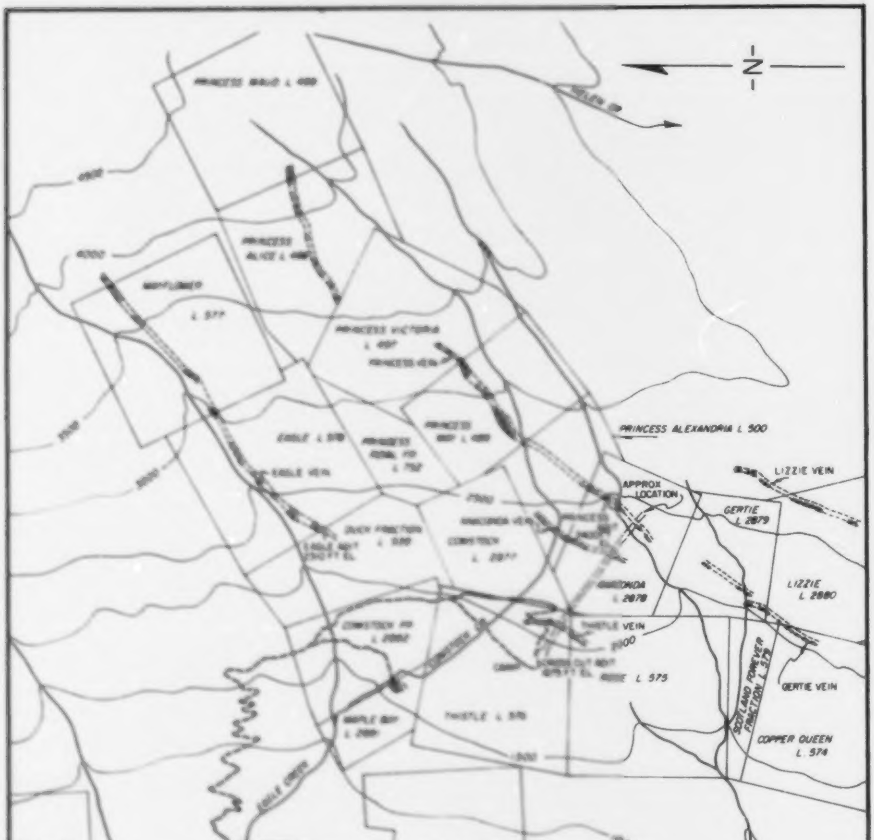

N
PRINCESS ALEXANDRIA L 500
LIZZIE VEIN
APPROX LOCATION
GERTIE L 2879
LIZZIE L 2880
THISTLE VEIN
2000
L 575
GERTIE VEIN
SCOTLAND FOREVER FRACTION L 573
COPPER QUEEN L 574
1000
PRINCESS CREEK
Maple Bay
BLUEBELL CREEK
0
1000
2,000
SCALE - FEET
QUARTZ VEIN SHOWING SURFACE EXPOSURES, WIDTHS EXAGGERATED
ADIT
COMPILED BY E.W. GROVE

Figure 4. Maple Bay area, Portland Canal.

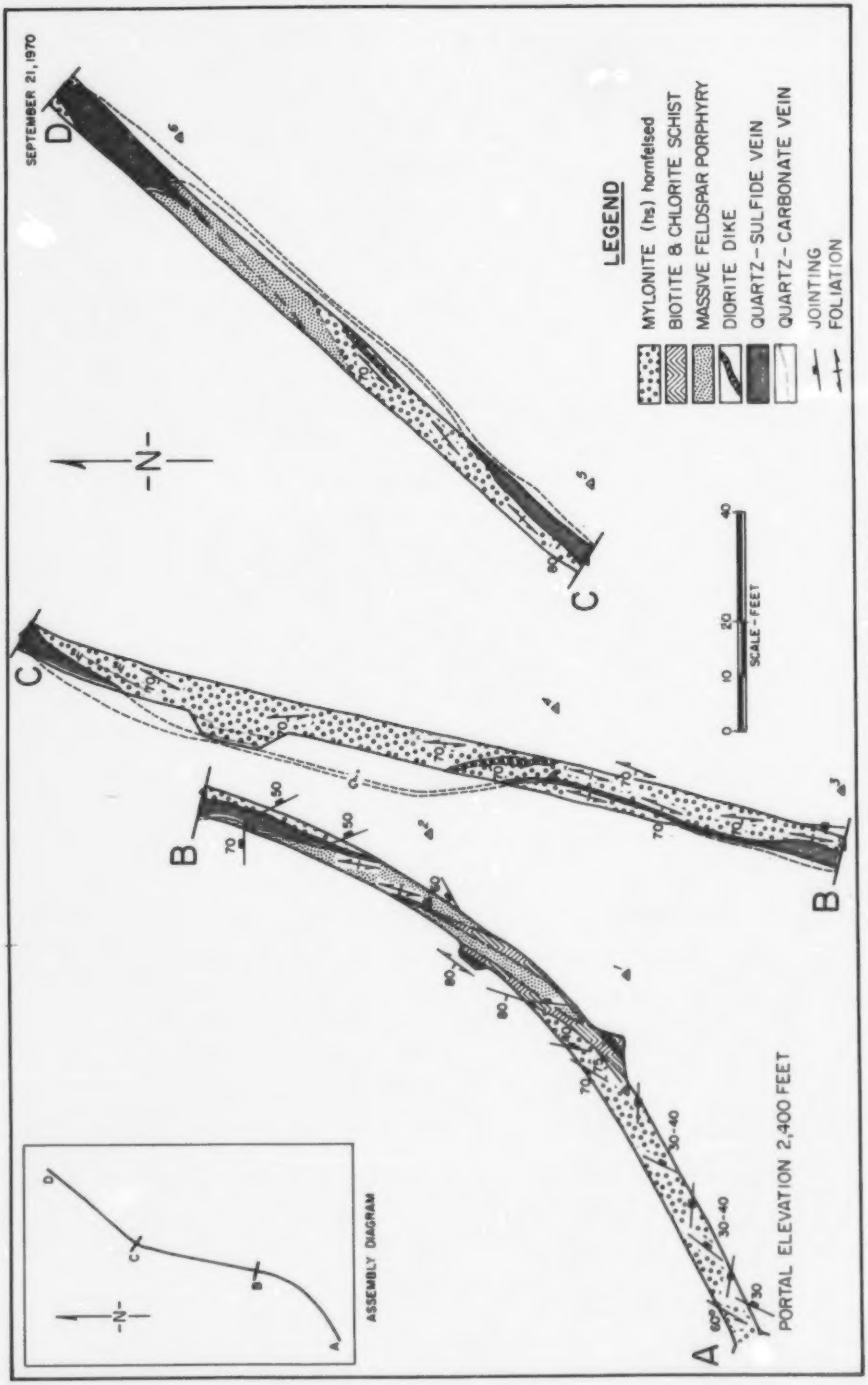

SEPTEMBER 21, 1970
LEGEND
MYLONITE (hs) hornfelsed
BIOTITE & CHLORITE SCHIST
MASSIVE FELDSPAR PORPHYRY
DIORITE DIKE
QUARTZ-SULFIDE VEIN
QUARTZ-CARBONATE VEIN
JOINTING
FOLIATION
-N-
SCALE-FEET
0
10
20
40
ASSEMBLY DIAGRAM
A
B
C
D
PORTAL ELEVATION 2,400 FEET
30
30-40
70
80
50
60

Figure 5. Maple Bay Copper Mines Ltd., Princess vein.

within the general area suggests a Lower Jurassic age for the Maple Bay sequence and a Middle or Upper Jurassic age for the Anyox siltstones. This volcanic-sedimentary succession has been extensively intruded by Tertiary granitic rocks and now exists as a large pendant located near the eastern edge of the Coast Plutonic Belt. The Anyox pendant is separated from the main bulk of the Bowser Basin by a narrow screen of granite. The volcanic-sedimentary succession of the Anyox pendant includes many gabbroic sill-like members and is traversed by extensive dyke swarms.

At Maple Bay, located on the extreme west edge of the Anyox pendant, the Lower(?) Jurassic succession includes a wide zone of cataclasites, mylonites, and chloritic schists which trend north-northeasterly across the easterly dipping country rocks. Both the country rocks and the deformed zone have been intruded by the Tertiary plutons which surround and underlie the Anyox pendant.

The quartz veins at Maple Bay are generally steep, northeasterly to northerly trending bodies largely confined to the cataclastic zone. On surface the vein system has been traced about 4 miles northerly from about 1 mile south of Maple Bay, near the pendant edge. The largest known vein in the system, the north-trending Outsider, has been traced for about 3,000 feet on surface and was mined over a vertical depth of 500 feet. Production from the Outsider vein, limited to one main oreshoot, was 138,854 tons, from which 66 ounces of gold, 4,882 ounces of silver, and 5,266,430 pounds of copper were produced. The oreshoot, which averaged 14 feet in width, was mined from 900 feet elevation to the surface.

The northeast-trending Eagle and Princess veins located on the Maple Bay Copper Mines Ltd. holdings are estimated to have surface lengths of about 3,300 feet and 3,000 feet respectively. The Anaconda vein has an apparent length of about 1,000 feet. Where exposed by surface cuts, the veins exhibit a sinuous, lenticular nature. The Eagle vein has been investigated by a short adit at elevation 2,310 feet, and the Princess vein has been explored by a 435-foot drift at elevation 2,400 feet, driven by Oscar Nukka in 1969. In 1970 the crosscut from elevation 1,875 feet was driven to intersect the downward extension of the Anaconda and Princess veins. Both veins are nearly vertical and were intersected in the projected area. Where intersected, the Princess vein was 8 feet wide and reportedly assayed 2.49 per cent copper. A 28.5-foot drift south on the vein showed the vein narrowing to 2 feet, with a reported assay of 3.44 per cent copper.

In the 2,400-foot elevation drift and 1,875-foot elevation crosscut, the country rocks include intercalated, banded ultra-mylonites, chloritic biotite schist, and brecciated hornblendite. The ultra-mylonites are finely pulverized rocks marked by grey-black laminations (hartschiefer texture), a hard, coherent, flinty nature, and by a blocky joint pattern. The joint surfaces are commonly coated with fine-grained sugary pyrite. In thin-section the ultra-mylonites consist of very fine-grained quartz and plagioclase clasts which are fresh and contain only minor incipient chlorite which occasionally imparts a poor foliation to the rock. Angular unstrained quartz commonly forms about 20 per cent of the rock, with the remainder uniform angular andesitic plagioclase. Secondary quartz is present as irregular beads. Fine-grained pyrite which forms up to 5 per cent of the total is disseminated through the rock. In surface outcrop the ultra-mylonite weathers silvery grey-green, exhibits weak foliation and crude banding, and retains its dense, hard character. The deformed hornblendite weathers dark green, lacks any directional texture, and is coarse grained. In fresh specimens the hornblende which comprises at least 60 per cent of the rock has a grey-green colour which shows against the dark-grey plagioclase matrix. In thin-section the texture is subophitic, and scant quartz is present as interstitial grains. Augite is found in most of the hornblendite as scattered phenocrysts. The mineral alteration is irregular and includes epidote, biotite, chlorite, iron oxide, and rare carbonate, The fractured, cataclastic texture of these rocks is well exhibited in thin-section.

The quartz veins consist primarily of milky white, sugary quartz with pods, streaks, and specks of fine-grained sulphides as well as scattered chlorite lenticles. The veins are commonly crudely banded and usually vuggy. The sulphide minerals include chalcopyrite, pyrrhotite, and scant pyrite, which together form spongy masses in the vein. The pyrrhotite distribution in the veins is erratic, but where found it usually borders and replaces the chalcopyrite. In the Princess vein the anastamosing reticulate pattern of quartz-sulphide appears to be related to the frequency of microfractures in the quartz vein. In the larger scale the sulphide concentrations and copper concentrations appear to be related to bulges or dilatant zones in the veins.

The detailed geological maps of the Princess adit and crosscut are on open file.

WORK DONE: Crown-granted claims, surface workings, and underground workings mapped; underground work, 1,603 feet on Thistle (Lot 576), Comstock (Lot 2877), and Anaconda (Lot 2878).

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1921, pp. G51, G52; 1923, p. 67; 1952, p. 76; 1955, p. 18; 1956, pp. 18, 19; 1957, p. 7; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 59.

ANYOX

CD, CU (No. 95, Fig. C)

By E. W. Grove

LOCATION: Lat. 55°25′ Long. 129°51′ (103P/5W)
Eighty miles north-northeast of Prince Rupert at Anyox, between Bonanza Creek and Carney Lake.

CLAIMS: One hundred and twenty-two claims, including the CD, CU, SUNSHINE groups of located claims and Mineral Leases M-115, M-129, M-192, M-196.

ACCESS: By boat and float plane from Prince Rupert.

OWNER: ARCADIA EXPLORATIONS LTD., 1119, 409 Granville Street, Vancouver 1.

METALS: Copper, iron.

DESCRIPTION: The 1970 work area lies south of Dam Lake on the west side of Falls Creek. The country rocks are amphibolite grade andesitic pillow volcanics which have been deformed and altered, and mineralized by widespread silicification, pyrrhotite and chalcopyrite, the latter which is found as disseminations, veinlets, and pods.

WORK DONE: Work during 1970 which was concentrated on the CU 43, 52, 54, and 56 claims included surface trenching and detailed ground magnetometer surveys.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 55; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 59.

ALICE ARM

RED POINT, COPPER CLIFF, DAN PATCH, DANA, SURPRISE (No. 74, Fig. C)

By N. C. Carter

LOCATION: Lat. 55°42–43′ Long. 129°32–34′ (103P/12E)
Between 1,000 and 3,700 feet elevation, in the Kitsault River valley.

CLAIMS: Ninety-one claims, including 15 Crown-granted claims (Lots 3796, 3798, 3806 to 3810, 3814, 3815, 3818 to 3820, 3825, 3828, 4070) and 21 recorded claims.

ACCESS: By road and helicopter from Alice Arm, 18 to 20 miles.

OWNER: DOLLY VARDEN MINES LTD., 1400, 409 Granville Street, Vancouver 2.

METALS: Copper, silver.

DESCRIPTION:

The Copper Belt claim group of Dolly Varden includes ground that was originally located in 1911 by prospectors attracted to the area by prominent gossans on bluffs and in deeply incised canyons on the west side of the Kitsault River valley. Up to the early 1930's, the various showings were developed by trenching, tunnelling, and limited diamond drilling. Many of the showings were investigated by personnel of Torbrit Silver Mines, Ltd. in the mid-1950's.

The geology of the upper Kitsault River area was described by J. M. Black in the Minister of Mines Annual Report for 1951. The area is underlain by argillaceous sedimentary rocks and fragmental volcanic rocks which Black divided into four formations, including two sedimentary and two volcanic formations. These rocks have been folded into a broad, northwest-plunging synclinal structure and have been intruded by feldspar porphyries mainly in the area west of the Kitsault River. The intrusive rocks, which appear to be subvolcanic in nature, occur in a northwest-trending belt extending from Evindsen Creek on the south to the Cambria Icefield on the north. The intrusive belt is up to 5,000 feet wide and includes two varieties, a relatively unaltered type in which the original porphyritic texture is preserved and which occurs mainly along the western part of the intrusive belt, and an intensely silicified, pyritized, "Copper Belt" variety which occurs along the eastern contact of the belt between Evindsen Creek and the west fork of the Kitsault River. Most of the copper showings occur in "Copper Belt" intrusive rocks.

The area included by the claims lies west of the Kitsault River between Evindsen Creek and the west fork of the Kitsault River (*see* Fig. 6). Elevations rise steeply from river level at 1,100 feet to 2,200 feet, after which the topography is more gentle, consisting of a series of ridges and bluffs and attaining a maximum elevation of close to 4,000 feet near the western boundary of the claims.

The area of the claims is underlain by the middle volcanic and sedimentary formations, as defined by Black (1951). The northwest-trending feldspar porphyry intrusive body separates an older fragmental formation from overlying argillaceous siltstones and greywackes. A smaller, elongate feldspar porphyry body occurs in the central part of the claims area, just southwest of the Wolf mine (*see* Fig. 6).

The fragmental volcanic rocks, which occur in the southwestern part of the area, include massive red and green tuffs and breccias. Some stratification was noted locally, particularly in a brick-red tuff-breccia unit seen near the confluence of Black Bear and Evindsen Creeks and along the road on the east side of the Kitsault River. This unit has a very fine-grained brick-red crystal tuff matrix which contains lapilli-sized and larger rounded fragments of purple, porphyritic volcanic rocks. More commonly, the volcanic sequence includes grey-green tuffs and breccias in which subrounded, 4-inch red to purple fragments of volcanic rocks of similar composition occur. Hematite and jasper alteration of the green matrix locally gives the rocks a mottled red and green appearance. Epidote is common on fractures, and west of the area shown on Figure 6 the volcanic rocks are intercalated with black and grey banded siltstones, part of an older sedimentary sequence.

The sedimentary formation that occurs along the west side of the Kitsault River has an apparently conformable contact with the underlying volcanic formation. A basal pebble conglomerate was seen on the west side of the Kitsault just north of Evindsen Creek (*see* Fig. 6). This unit consists of one-quarter-inch pebbles of volcanic rock and limestone contained in a buff-coloured carbonate-rich matrix.

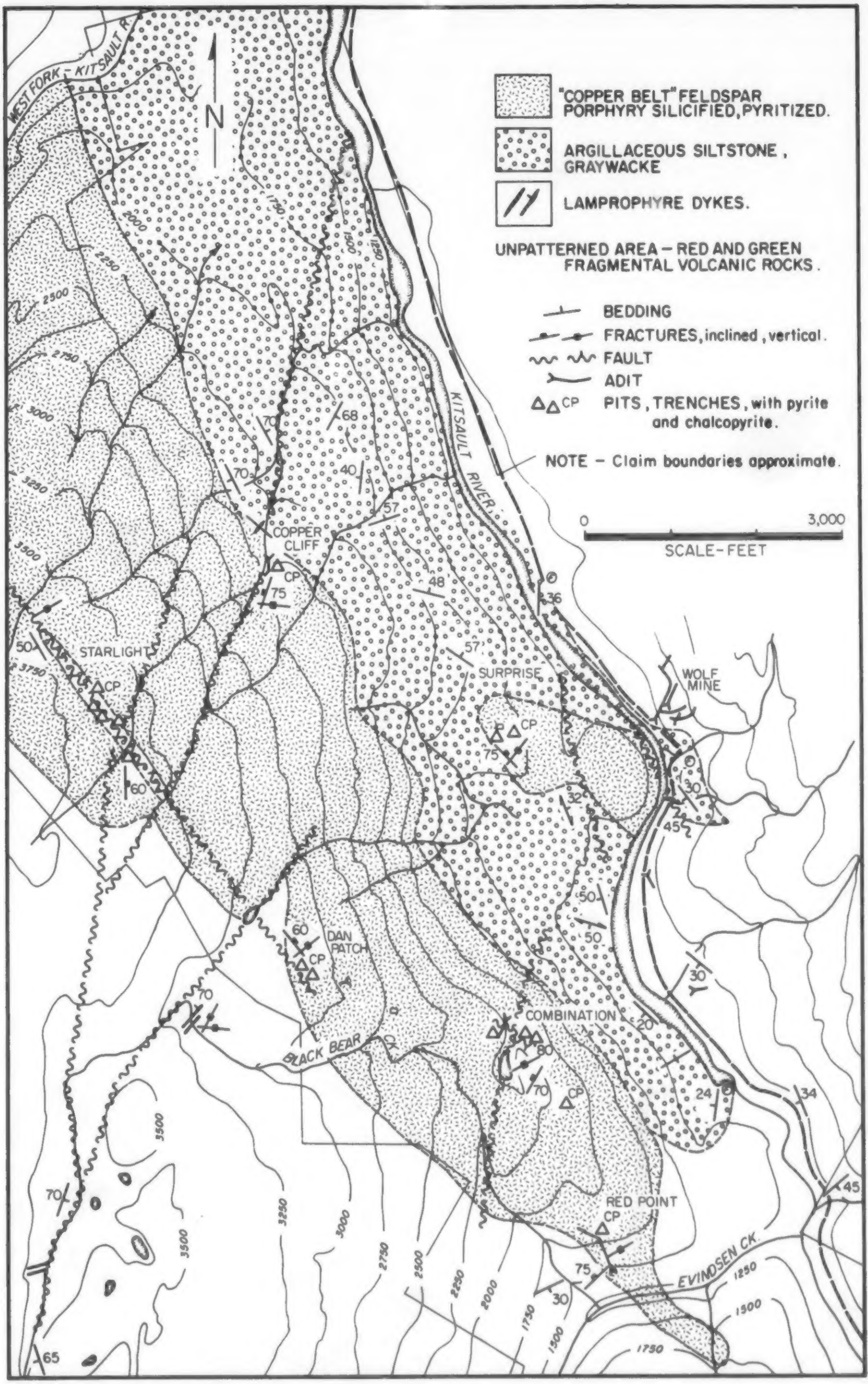

N
"COPPER BELT" FELDSPAR PORPHYRY SILICIFIED, PYRITIZED.
ARGILLACEOUS SILTSTONE, GRAYWACKE
LAMPROPHYRE DYKES.
UNPATTERNED AREA – RED AND GREEN FRAGMENTAL VOLCANIC ROCKS.
BEDDING
FRACTURES, inclined, vertical.
FAULT
ADIT
CP PITS, TRENCHES, with pyrite and chalcopyrite.
NOTE – Claim boundaries approximate.
0
3,000
SCALE-FEET
WEST FORK – KITSAULT R.
KITSAULT RIVER
COPPER CLIFF
STARLIGHT
SURPRISE
WOLF MINE
DAN PATCH
BLACK BEAR CK.
COMBINATION
RED POINT
EVINDSEN CK.
CP
2000
2250
2500
2750
3000
3250
3500
3750
1750
1500
1250
70
68
40
57
48
36
57
75
60
32
30
45
50
20
24
34
80
65
Y

Figure 6. Geology of the Red Point, Copper Cliff, Dan Patch, etc., claim groups.

Pelecypod shells are common, as is disseminated pyrite. The conglomerate grades upward through fossiliferous greywackes, noted along the Kitsault River road, to thinly bedded and banded argillaceous siltstones. These rocks, which make up the major part of the sedimentary formation, are commonly contorted, particularly along the contact with the feldspar porphyry intrusive body. At the Copper Cliff showing (*see* Fig. 6), the sediments adjacent to the contact are isoclinally folded and there is some evidence that the intrusive here is floored by sedimentary rocks. Some evidence of doming of the sedimentary rocks was noted around the smaller intrusive body near the Kitsault River.

The feldspar porphyry intrusives vary in texture and composition, depending on the degree of alteration. Where relatively fresh, mainly in the central and western portions of the main body, it is a grey, medium-grained rock that features crowded 1 to 2-millimetre phenocrysts of plagioclase (An_{30}) and biotite (altered to a mixture of sericite-carbonate-chlorite) in a very fine-grained matrix of quartz and feldspar. Some varieties contain hornblende as the chief mafic mineral.

The contact between this fresher feldspar porphyry and fragmental volcanic rocks is a gradational one, suggesting that the feldspar porphyry is part of a volcanic centre or feeder complex. West from the Starlight showings (*see* Fig. 6), massive grey feldspar porphyry is gradational to a rock of similar composition which contains 2 to 6-inch fragments of similar composition. With increasing jasper alteration, the rock is transformed to the typical red and green fragmental volcanic rock.

With increasing alteration the feldspars of the porphyries become sericitized, abundant carbonate is developed in the matrix, and mafic minerals are completely obliterated. The greatest degree of alteration occurs along the eastern margin of the intrusive, where the rock is intensely silicified and pyritized, giving rise to the development of prominent gossans along the eastern contact. Typically, the rock in this area is fine-grained, light grey-green to buff, iron-stained rock consisting essentially of quartz, sericite, and clay minerals, with abundant disseminated pyrite and some carbonate and chlorite. Vague outlines of original 1 to 2-millimetre feldspars may be seen locally. Depending on the degree of silicification, one-half to 1-inch rounded rock fragments may be cemented by irregular areas of fine-grained quartz and minor feldspar. The later quartz also contains pyrite and chalcopyrite.

Northeast-striking, steeply dipping, dark-green, fine-grained lamprophyre dykes of postmineral age were noted in a number of localities, including the Red Point and Combination showings, in Black Bear Creek, and along the Kitsault River road.

Numerous north-northeast and northwest faults transect the area and govern the direction of most of the creeks and the alignment of ridges and gullies. In detail, much of the contact area between the feldspar porphyry and surrounding rocks is faulted and rectilinear rather than smooth, as depicted on Figure 6.

The principal copper showings occur near intersections of major fault zones in the silicified and pyritized areas along the eastern margin of the feldspar porphyry intrusive, including the Red Point, Combination, and Copper Cliff showings. Two others, the Dan Patch and Starlight zones, occur near the western margin of the intrusive, with the Starlight showings occurring in a screen of sedimentary rocks (*see* Fig. 6). The Surprise showings occur near the western edge of the smaller intrusive body along the Kitsault River.

The most southerly showings, those of the Red Point claims, are at an elevation of 1,750 feet above Evindsen Creek (*see* Fig. 6). A north-trending zone, exposed in a series of trenches and two adits, includes 2-foot-wide lenses of chalcopyrite in quartz in one trench. Two hundred feet vertically below the surface exposures, a 700-foot-long adit was driven (*see* Fig. 6). The adit cut minor chalcopyrite mineralization near the portal and from there to the face intersected grey feldspar porphyry containing abundant disseminated pyrite. Closely spaced northeast and northwest fractures cut the feldspar porphyry throughout the adit. Rock chips were collected at 10-foot intervals from the portal to the face of the adit and the average of these samples assayed: Gold, trace; silver, trace; copper, 0.025 per cent.

The Combination showing is situated immediately north of a small lake at an elevation of 2,200 feet (*see* Fig. 6). The principal showing is a quartz-barite-sulphide vein occurring in a west-northwest shear zone in grey feldspar porphyry and exposed in four partly sloughed trenches over a possible strike length of 70 feet. The width of the zone varies from 12 feet in the easternmost trench to 3 feet or so in the western trench. In the eastern trench the first 6 feet of vein material from the footwall consists of quartz and barite, with stringers and blebs of chalcopyrite and pyrite. A chip sample across this section assayed: Gold, trace; silver, 0.4 ounce per ton; copper, 0.15 per cent. A similar sample across the next 4 feet of vein, containing more closely spaced sulphide stringers, assayed: Gold, 0.02 ounce per ton; silver, 2.4 ounces per ton; copper, 3.95 per cent.

Several hundred feet northwest of these trenches, an open cut exposes a quartz-barite-pyrite-chalcopyrite zone with minor galena and arsenopyrite. A chip sample across the exposed width of 8 feet assayed: Gold, 0.01 ounce per ton; silver, 1.4 ounces per ton; copper, 0.67 per cent; lead, 0.01 per cent. Immediately below the cut, an adit, now sloughed at the portal, was driven in a southerly direction. The adit, although collared in a 10-foot-wide basic dyke, apparently intersected the mineralized zone, according to material seen on the dump. A grab sample from the dump assayed: Gold, 0.02 ounce per ton; silver, 1.2 ounces per ton; copper, 0.95 per cent.

A bare ridge, south of the showings and immediately east of the small lake, displays bright-red iron staining, with abundant pyrite occurring not only as disseminations but also in numerous closely spaced northeast-striking shear zones. Several hundred feet southeast of this gossan zone the Red Point Extension showings are exposed in three trenches. Here, a narrow shear zone contains pyrite and chalcopyrite.

The Dan Patch or Racehorse showings are situated northwest of the Combination at an elevation of 3,100 feet and, like those of the Combination, occur in a west-northwest-trending zone in silicified and pyritized feldspar porphyry. The largest and westernmost cut is subparallel to the trend of the zone and is 50 feet long. Local concentrations of quartz along the cut contain pyrite and very minor chalcopyrite. A chip sample taken along the length of the cut assayed: Gold, trace; silver, 0.2 ounce per ton; copper, 0.04 per cent; lead, 0.04 per cent. In the other trenches chalcopyrite is most prominent in quartz lenses in feldspar porphyry.

The Starlight showings are somewhat different in that sulphides occur in narrow northwest shears in a screen of metasedimentary rocks near the western contact of the feldspar porphyry intrusive. The showings occur at intervals over a strike length of approximately 800 feet and consist of quartz breccia veins with pyrite, chalcopyrite, and some sphalerite and galena in shear zones in greywackes and siltstones and enclosing light-green feldspar porphyry. A character sample from the northernmost showing, which is less than 2 feet wide, assayed: Gold, 0.01 ounce per ton; silver, 2 ounces per ton; copper, 1.46 per cent; lead, 0.11 per cent; zinc, 0.035 per cent. Two hundred and fifty feet south, a chip sample from a 3½-foot-wide zone of quartz with stringers of pyrite and chalcopyrite cutting feldspar porphyry and enclosed siltstone fragments assayed: Gold, trace; silver, trace; copper, 0.12 per cent. This zone is traceable for 40 feet along strike. The principal showing, exposed in a trench on the north side of a swamp at the junction of northwest and north-northeast fault zones, consists of a 5-foot-wide zone in brecciated black siltstone. Quartz lenses, following northwest shears, contain stringers of pyrite and chalcopyrite and some sphalerite. A chip sample across the exposed width returned an assay of: Gold, 0.02 ounce per ton; silver, 0.1 ounce per ton; copper, 0.13 per cent; lead, 0.025 per cent; zinc, 0.54 per cent.

The Copper Cliff showings are situated northeast of the Starlight zone, in Gash Creek, at an elevation of 2,500 feet. Several open cuts on the south side of Gash Creek are in silicified, iron-stained feldspar porphyry, containing stringers and disseminations of pyrite and minor chalcopyrite. Closely spaced shear planes trend north-northeast, paralleling the trend of Gash Creek. Better mineralized sections appear to be controlled by east-west, vertical joints. The walls of the zone are not defined. A chip sample taken across the 30-foot length of the cut assayed: Gold, 0.01 ounce per ton; silver, trace; copper, 0.03 per cent; lead, trace. An adit, driven 50 feet vertically below the open cuts, passed from altered feldspar porphyry to a fresher variety at the face. A chip sample taken along the west wall from the portal to the face, a distance of 110 feet, assayed: Gold, 0.01 ounce per ton; silver, trace; copper, trace; lead, trace.

The Surprise (Ouray) showings are situated near the western margin of a smaller body of light-green feldspar porphyry near the level of the Kitsault River (*see* Fig. 6). The principal showings are situated at 1,600 feet elevation in a number of old pits and trenches close to an old cabin. The main cut, 100 feet south of the cabin, is 40 feet long and oriented east-west. The strike of the mineralized zone is possibly the same, but the width is not exposed. The zone consists of blebs and stringers of chalcopyrite and pyrite, plus galena and sphalerite, in quartz-carbonate-barite lenses which cut feldspar porphyry. A chip sample taken along the trench for a distance of 25 feet assayed: Gold, 0.03 ounce per ton; silver, 0.6 ounce per ton; copper, 0.43 per cent; lead, 0.02 per cent; zinc, 0.14 per cent.

WORK DONE: Topography and surface workings mapped; surface geological mapping, 1 inch equals 300 feet; and geochemical soil survey, 500 samples covering 34 claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1913, pp. 79–83; 1916, pp. 80–82; 1926, p. 77; 1951, pp. 76–83, 96, 98, 99.

TIGER (No. 75, Fig. C)

By N. C. Carter

LOCATION: Lat. 55°42′ Long. 129°30′ (103P/11W, 12E)
On the east side of the Kitsault River, 18 miles north of Alice Arm, between 1,100 and 2,500 feet elevation.

CLAIMS: Two Crown-granted claims (Lots 3613, 3614) and one fraction (Lot 3615).

ACCESS: By road and trail from Alice Arm.

OWNER: SILVER BUTTE MINES LTD., 705, 850 West Hastings Street, Vancouver 1.

METAL: Silver.

DESCRIPTION: A northerly striking quartz-barite-jasper vein cuts massive fragmental volcanic rocks. The vein, which is exposed in three adits and a number of open cuts, contains pyrite, marcasite, pyrargyrite, and galena.

WORK DONE: Blasting and trenching in an area 400 feet south of the highest or number 1 adit.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1918, pp. K54–60; 1928, pp. C87, C88; 1951, pp. 101, 102; 1968, p. 59; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 60–62.

ROYAL (No. 76, Fig. C)

By N. C. Carter

Location: Lat. 55°41′ Long. 129°31′ (103P/12E)
On the south end of Dolly Varden Mountain, between Evindsen Creek and the Kitsault River.

Claims: Seven Crown-granted claims (Lots 1080 to 1086) and two recorded claims.

Access: By road and trail, north from Alice Arm a distance of 16 miles.

Owner: SILVER BUTTE MINES LTD., 705, 850 West Hastings Street, Vancouver 1.

Metals: Copper, silver.

Description:

The Royal claims are situated south and west of the old Dolly Varden mine (*see* Fig. 7). Although the claims were located many years ago, there are no records of early work on the property.

The north half of the claim group is underlain by red and green crystal-lithic tuffs and breccias which commonly contain greenish 2 to 3-inch angular fragments of porphyritic volcanic rocks in a fine-grained red hematitic crystal tuff matrix. These rocks are massive to crudely stratified and are relatively unaltered. A belt of schistose light-grey crystal tuffs, paralleling the northwesterly Homestead Creek fault zone, underlies the southern half of the property. These rocks contain abundant fine-grained disseminated pyrite and exhibit a cataclastic texture in thin-section. Carbonate-sericite alteration is widespread and a directional fabric is imparted by parallel arrangement of the original feldspar crystal fragments and streaks of sericite in the matrix.

Schistosities measured strike northwesterly and are vertical to steeply north dipping. Two prominent north-northeast topographic linear features cross the property and probably mark the course of shear or fault zones. The timing of movement along these zones relative to the northwesterly Homestead Creek fault zone is not known. Evidence elsewhere in the Alice Arm district indicates the latest movement occurred along the northwest faults.

Disseminated pyrite is widespread in the grey schistose crystal tuffs in the southern half of the property. The principal showings are situated in the southeastern part of the property near the intersection of north-northeast and northwest fault zones (*see* Fig. 7). Old pits and trenches expose a light-grey bleached rock containing abundant disseminated pyrite. The zone as exposed is 5 feet wide and consists of closely spaced northwesterly shears which dip steeply north and some quartz stringers which contain little sulphide. A characteristic sample from one of of the pits assayed: Gold, trace; silver, 1.2 ounces per ton; copper, 0.03 per cent.

Work done: Trenching and blasting in the vicinity of the original workings.

References: *Minister of Mines, B.C.,* Ann. Repts., 1922, p. 61; 1928, p. 85; 1956, p. 21.

E and D (WILDCAT) (No. 77, Fig. C)

By N. C. Carter

Location: Lat. 55°40′ Long. 129°31′ (103P/12E)
West of the Kitsault River, 15 miles north of Alice Arm.

Claims: Four recorded claims.

Access: By road and trail from Alice Arm.

Owners: ED ANDERSON and D. COLLISON, Alice Arm.

Metal: Copper.

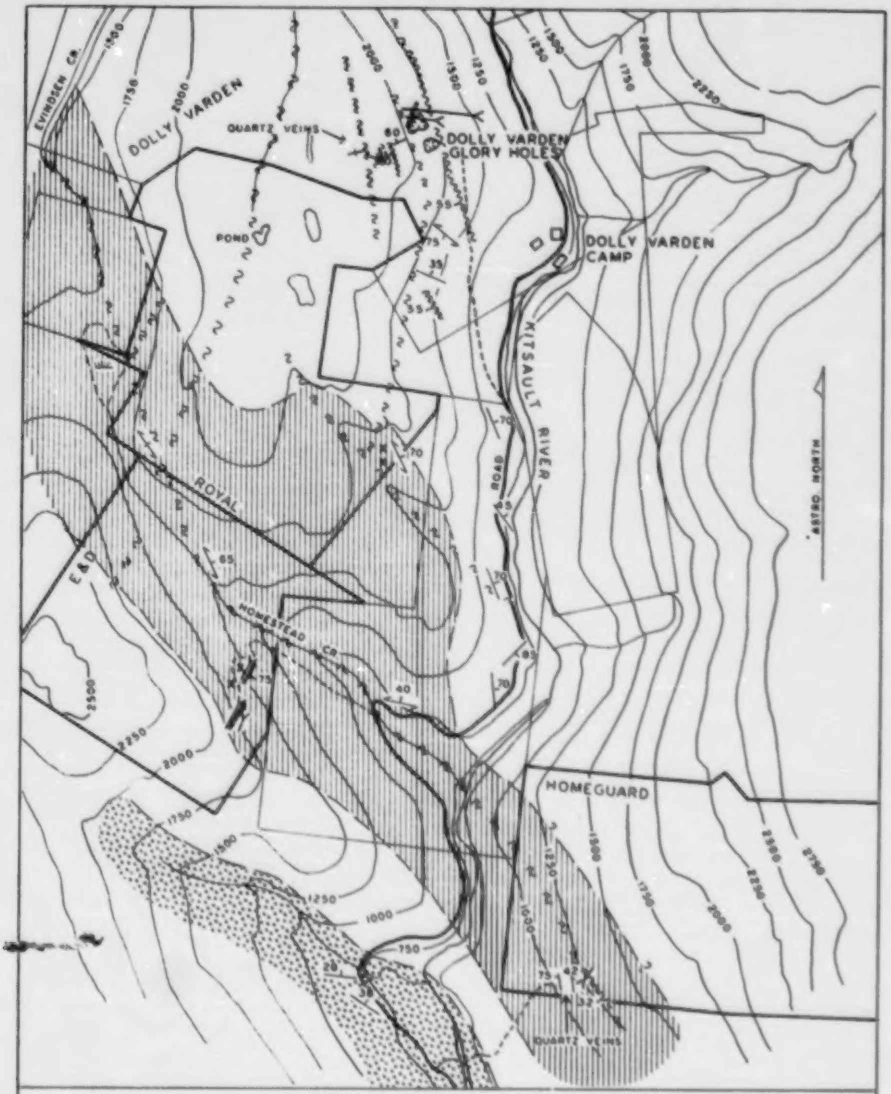

EVINDSEN CR.
DOLLY VARDEN
QUARTZ VEINS
DOLLY VARDEN GLORY HOLES
POND
DOLLY VARDEN CAMP
KITSAULT RIVER
ROAD
ROYAL
E&D
HOMESTEAD CR.
HOMEGUARD
QUARTZ VEINS
ASTRO NORTH
1250
1500
1750
2000
2250
2500
2750
1000
750
LEGEND
Hornblende lamprophyre dykes
Grey-green crystal-lithic tuffs; pyritic, schistose in part
Red and green crystal-lithic tuffs and breccias
Siltstone, pebble conglomerate
Fault, defined, approximate
Bedding
Schistosity
Contact, approximate
Pits, trenches
Adit
Note: Claim boundaries are approximate
Scale 1000 0 1000 2000 Feet

Figure 7. Geology of the Royal, E and D, and Homeguard.

DESCRIPTION:

The E and D claims were located in 1970 to cover the old Wildcat copper showings which were discovered prior to 1916.

The principal showings and old workings, situated south of Homestead Creek between elevations of 1,400 and 1,700 feet (*see* Fig. 7), are accessible by trail from the Kitsault River road. As shown on Figure 7, the major part of the claim group is underlain by schistose grey-green crystal tuffs, which border a major northwest fault zone along Homestead Creek. The rocks contain abundant disseminated pyrite and commonly exhibit a bleached appearance due to widespread carbonate, sericite, and chlorite alteration. In thin-section, the rocks are characterized by a cataclastic texture, and the long axes of the original crystal fragments are arranged in parallel fashion.

The copper showings occur in northwest-trending zones in small shears and brecciated zones parallel to the main fault along Homestead Creek. A subsidiary fracture pattern in the area of the showings is north-northeast, and 10-foot-wide hornblende lamprophyre dykes of postmineral age were noted following this fracture direction.

Original development work included three adits and a number of open cuts. The lowest adit, at an elevation of 1,440 feet, was driven adjacent to a hornblende lamprophyre dyke in a southwesterly direction for a distance of more than 200 feet. The adit was driven entirely in light grey-green, bleached, partly schistose crystal tuff which contains abundant disseminated pyrite. Much of the east wall of the adit is occupied by the chilled margin of the hornblende lamprophyre dyke, which dips steeply east. Occasional quartz veins and closely spaced north-northeast steeply east-dipping fractures were noted throughout the length of the tunnel. Copper staining was observed in a few places but little chalcopyrite was noted. A chip sample along the west wall of the tunnel from the portal to the face assayed: Gold, trace; silver, trace; copper, 0.01 per cent.

A second adit, at an elevation of 1,635 feet, was not examined because of a slide at the portal. Old reports indicate some 400 feet of drifting and crosscutting in this adit, which was also driven in a southeasterly direction. A north-northeast-striking 10-foot-wide lamprophyre dyke was noted on the east side of the portal. Brecciated green crystal tuff containing streaks and blebs of quartz, pyrite, and chalcopyrite was noted in the adit dump. A smaller tunnel, reportedly 20 feet long, and several open cuts, all slightly higher than the second tunnel, were not examined. Several open cuts between the lowest and middle adits (*see* Fig. 7) expose mottled green crystal tuffs containing irregular lenses of quartz and coarse pyrite and chalcopyrite. No widths were exposed, but old reports indicate that these zones were several feet wide. A grab sample from one of these cuts assayed: Gold, trace; silver, 1.1 ounces per ton; copper, 2.2 per cent.

WORK DONE: Blasting and trenching adjacent to the original workings.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1927, pp. C74, C75; 1932, p. A56.

HOMEGUARD (No. 123, Fig. C)

By N. C. Carter

LOCATION: Lat. 55°39′ Long. 129°30′ (103P/11W, 12E)

The claims are situated on the east side of the Kitsault River, 14 miles north of Alice Arm.

CLAIMS: Eight recorded claims and one Crown-granted claim (Mineral Lease M-257).

ACCESS: By road and trail from Alice Arm.

OWNERS: T. S. MacKay, S. J. O. McClay, A. Robertson, of Vancouver; Gunn Fiva, of Alice Arm.

OPERATOR: SILVER BUTTE MINES LTD., 705, 850 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION:

The Homeguard claims are situated on the east side of the Kitsault River and are accessible by trail and cable-car crossing from the road on the west side of the river (*see* Fig. 7). The claims were located prior to 1916 and were known variously as the Homeguard, Central, and Traveller. Early work included some tunnelling and trenching. In 1955 and 1956, Torbrit Silver Mines Limited carried out a resistivity survey, and completed 2,150 feet of diamond drilling on the ground which had been located as the Boulder group.

Most of the work on the property has been carried out in and adjacent to what appear to be very large boulders of volcanic rock containing varying amounts of copper mineralization. The source of these large boulders is not known, but their size and distribution in one particular area suggest that they have not travelled far.

Three showings were examined in the southwest part of the claim group (*see* Fig. 7). The uppermost showing, at an elevation of 1,220 feet, was developed by a trench and adit driven across a northwest shear zone which may be part of the southeastern continuation of the Homestead Creek fault zone. The adit is caved 25 feet in from the portal and old reports indicate that beyond this, the adit was driven through 120 feet of slide material before bedrock was reached. The adit was driven in the footwall of a 4-foot-wide quartz vein which parallels the shear direction and dips moderately west. The hangingwall of the vein consists of a 6-inch-thick capping of limonite, and the vein contains 1-inch angular fragments of wallrock in addition to fine-grained pyrite and chalcopyrite with minor galena, sphalerite, and tetrahedrite. A chip sample across the 4-foot width assayed: Gold, trace; silver, 1.1 ounces per ton; copper, 0.52 per cent; lead, 0.52 per cent; zinc, 0.94 per cent. The host rocks are grey-green crystal-lithic tuffs which contain finely disseminated pyrite and exhibit chloritic alteration.

Below the adit, at an elevation of 1,150 feet, a quartz breccia vein, 7 feet wide and exposed over 20 feet, strikes north and dips moderately east. A chip sample across 7 feet assayed: Gold, trace; silver, 0.5 ounce per ton; copper, 0.55 per cent; lead, 0.83 per cent; zinc, 3.40 per cent. At 1,080 feet elevation, a vein of similar trend, but dipping steeply west, is exposed in a 20-foot-long trench. The mineralized structure is 2 to 3 feet wide and consists of irregular patches of white quartz cementing 1 to 6-inch rock fragments. A grab sample from this zone assayed: Gold, trace; silver, 1.4 ounces per ton; copper, 3.24 per cent; lead, 0.02 per cent; zinc, 0.07 per cent.

WORK DONE: Trenching and blasting in the vicinity of the original workings.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1922, p. 61; 1928, p. 85; 1956, p. 21.

KINSKUCH (No. 78, Fig. C)

By N. C. Carter

LOCATION: Lat. 55°39′ Long. 129°22′ (103P/11W)
At approximately 4,000 feet elevation, on the southeast side of Kinskuch Lake, 15 miles north-northeast of Alice Arm.

CLAIMS: KINSKUCH 1 to 3, 5, 7, 8; TIMBERLAND; SOUL 1, 2; SOUL Fraction; JEAN; SUNSHINE 1 to 4; TED 1 to 6.

ACCESS: From Alice Arm by float plane or helicopter, 15 miles.

Operator: KERR ADDISON MINES LTD., 405, 1112 West Pender Street, Vancouver 1.

Metal: Copper.

Description: Pyrite and chalcopyrite occur in fine fractures, shears, and veinlets in chloritized volcanic rocks of intermediate composition. These rocks have been intruded by irregular masses of diorite. Alteration, consisting of chlorite, carbonate, and locally sericite, is partly concentric about the diorite bodies.

Work done: Induced polarization and magnetometer surveys, 5 line-miles covering Kinskuch 1 to 3, Ted 4, and Soul 1 and 2; surface diamond drilling, two holes totalling 1,019 feet on Kinskuch 1 and 2.

References: *Minister of Mines, B.C.*, Ann. Repts., 1956, p. 21; 1965, p. 65; 1966, p. 47; Assessment Reports 712, 2538.

ROUNDY CREEK (No. 79, Fig. C)

By N. C. Carter

Location: Lat. 55°25′ Long. 129°39′ (103P/6W)
At 1,000 feet elevation south of Alice Arm, on Roundy Creek, 1½ miles from tidewater.

Claims: ROUNDY; ROUNDY 1, 3; LEE 1, 2, 23 to 54; CREEK Fraction; CANYON Fraction; CJ 1 to 7 Fractions; RAIN 1 to 4; GEO 1 to 8.

Access: By road from Kitsault, 2½ miles west.

Owner: SILEURIAN CHIEFTAIN MINING COMPANY LIMITED, Ninth Floor, 850 West Hastings Street, Vancouver 1.

Metal: Molybdenum.

Description:

Diamond drilling on the property between 1965 and 1969 uncovered several zones of good-grade molybdenite mineralization in that part of the composite quartz monzonite porphyry intrusion lying south of Sunshine Creek (*see Minister of Mines, B.C.*, Ann. Rept., 1968; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969).

Late in 1969 a decision was made to drive an adit from the south side of Sunshine Creek in a southerly direction to test the zones of mineralization. The adit, collared at an elevation of 1,050 feet and consisting of east and west crosscuts off the main drift and several subdrifts off the east crosscut, was completed in early 1970 (*see* Fig. 8). A mineralized zone, with grades in excess of 0.3 per cent molybdenite, was intersected throughout the length of the east crosscut and subdrifts, and along the main drift south of its junction with the crosscuts.

To further test this zone, a second adit was collared at an elevation of 850 feet and also driven in a southerly direction. This adit encountered only sparse molybdenite mineralization, with the exception of the short, east crosscut near the end of the main drift where near-massive lenses of molybdenite occur in leucocratic quartz monzonite and alaskite. A press release by the company quoted the grade in this section as being 109 feet of better than 1 per cent molybdenite.

Late in the summer, a diamond drilling programme was initiated to further test this new occurrence of high-grade molybdenite mineralization. This programme consisted of 11 horizontal and angle holes from the 850 adit, all drilled in an east to northeast direction (*see* Fig. 8). These holes intersected only short, scattered sections of mineralization grading more than 0.2 per cent molybdenite. The final two holes, UG 12 and 13, were drilled from the upper adit at 60-degree angles in a northeasterly direction. These holes, collared in better than 0.2 per cent molybdenite mineralization, demonstrated that the zone at this point in the upper adit extends some 70 to 100 feet vertically below the level.

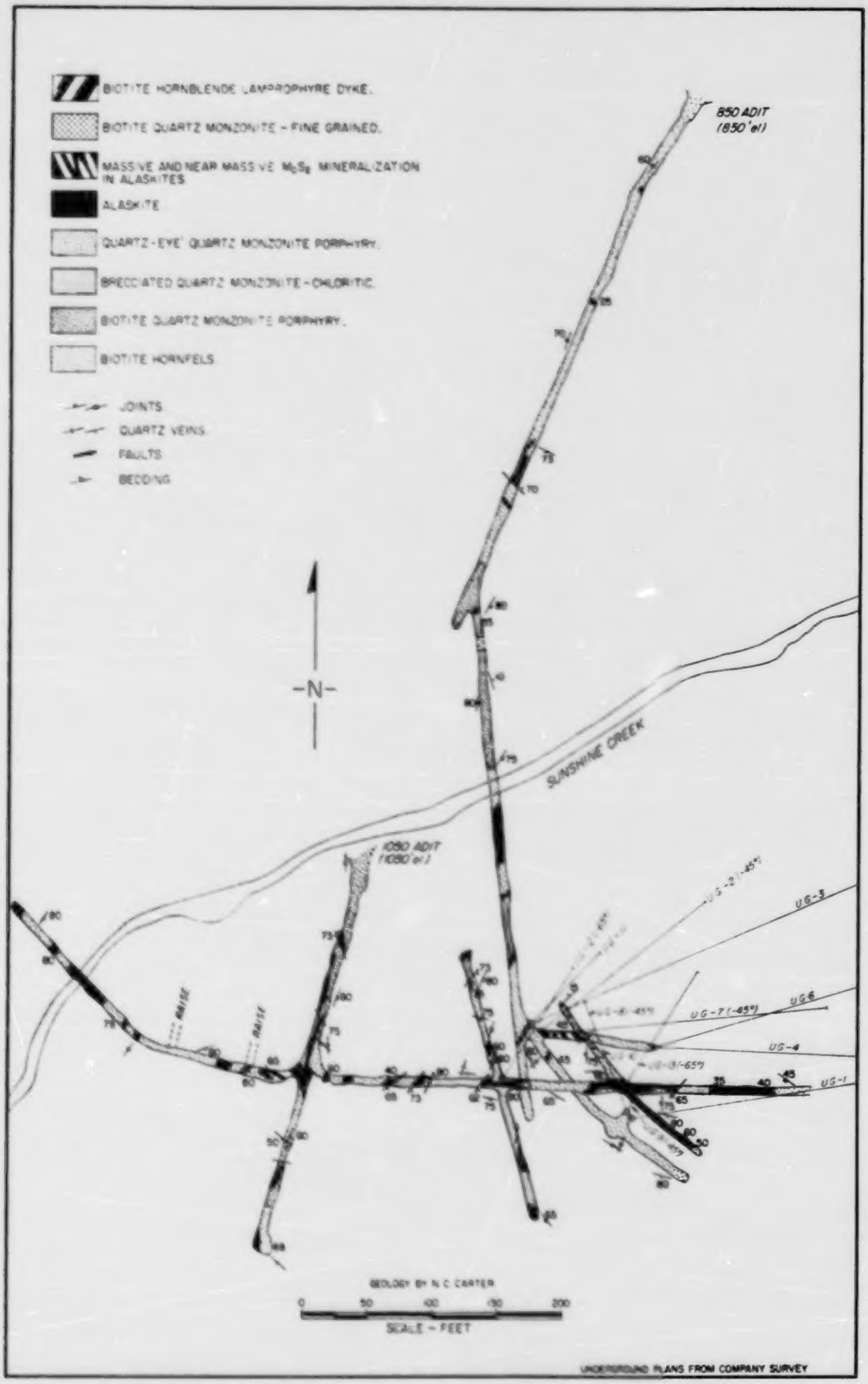

BIOTITE HORNBLENDE LAMPROPHYRE DYKE.
BIOTITE QUARTZ MONZONITE – FINE GRAINED.
MASSIVE AND NEAR MASSIVE MoS_2 MINERALIZATION IN ALASKITES
ALASKITE
QUARTZ-EYE' QUARTZ MONZONITE PORPHYRY.
BRECCIATED QUARTZ MONZONITE – CHLORITIC.
BIOTITE QUARTZ MONZONITE PORPHYRY.
BIOTITE HORNFELS
JOINTS
QUARTZ VEINS
FAULTS
BEDDING
850 ADIT
(850' el)
1050 ADIT
(1050' el)
-N-
SUNSHINE CREEK
RAISE
RAISE
UG-2 (-45°)
UG-3
UG-7 (-45°)
UG-6
UG-4
UG-1
GEOLOGY BY N. C. CARTER
0
50
100
150
200
SCALE – FEET
UNDERGROUND PLANS FROM COMPANY SURVEY

Figure 8. Sileurian Chieftain Mining Company Limited, underground plan of Roundy Creek property.

Based on surface and underground exploration work, a press release by the company has quoted indicated reserves of 1.5 million tons grading 0.347 per cent molybdenite in the main zone, plus an estimated 39,000 tons grading 0.668 per cent molybdenite in the original high-grade zone exposed on the north side of Sunshine Creek, some 200 feet southwest of the 1050 level portal.

The 1050 level drift was driven more or less parallel to a 2-foot-wide fine-grained dark-green biotite lamprophyre dyke. The first 100 feet of the drift is in a medium-grained, light-grey biotite quartz monzonite featuring a seriate texture and consisting essentially of 2 to 4-millimetre grains of quartz, fresh euhedral plagioclase (An_{28}), and perthitic orthoclase, plus scattered biotite flakes which are almost completely altered to chlorite and sericite.

The biotite quartz monzonite in the main drift is in fault contact with the most widespread intrusive phase, "quartz-eye" quartz monzonite porphyry. This rock type is leucocratic, containing only a very minor amount of fine biotite. Twenty-five per cent of the rock is composed of 2 to 4-millimetre phenocrysts of subhedral quartz and perthitic potash feldspar and euhedral plagioclase (An_{28-32}), which are set in a very fine-grained matrix of quartz and feldspar. Sericite occurs both in the rock matrix and as coatings on fracture planes. With increasing intensity of alteration, this rock type may have abundant sericite and carbonate in the matrix, while feldspar phenocrysts display partial sericite alteration.

Where extremely crushed and fractured, the "quartz-eye" quartz monzonite porphyry grades into brecciated quartz monzonite in which the feldspar phenocrysts are partially broken down and the many randomly oriented fractures are coated with chlorite, sericite, carbonate, and molybdenite. This rock type occupies the initial part of the east crosscut on the 1050 level.

Intruding all of the aforementioned rock types are dykes and irregular masses of fine-grained white alaskite which generally have sharp, steeply dipping contacts. On the 1050 level, alaskite occurs in a westerly trending dyke-like body at the junction of the main drift and crosscuts, and as a larger, more irregular body near the end of the east crosscut. The rock consists of a fine-grained mosaic of quartz, sodic plagioclase, granophyre, and some sericite. Near the end of the east crosscut on the 1050 level, the alaskite is gradational to a fine-grained leucocratic quartz feldspar porphyry in which 1 to 4-millimetre quartz eyes and plagioclase and potash feldspar phenocrysts comprise 15 per cent of the rock by volume. This porphyry is not as crowded as the typical "quartz-eye" quartz monzonite porphyry.

Contacts between the intrusive rocks and biotite hornfelsed argillaceous sedimentary rocks were intersected at the end of the main drift on the 1050 level and near the end of the east crosscut (*see* Fig. 8). The dip of the contacts and its location on surface with respect to those seen in the adit indicate an inward-dipping intrusive contact.

The 1050-level adit intersects a number of hornblende and biotite lamprophyre dykes which generally range in width from 2 to 10 feet. A 3-inch-wide chilled contact is common in these dykes, and magnetite is a widespread accessory mineral.

Sericite is the most common alteration mineral seen on the 1050 level, where it occurs in veinlets and fractures and in the matrix of the leucocratic "quartz-eye" quartz monzonite porphyry. Argillic alteration of feldspars is relatively minor in most of the intrusive rock types. The distribution of the biotite quartz monzonite porphyry relative to the leucocratic intrusive types which are host to the molybdenite mineralization suggests that much of the biotite may be of secondary origin. Biotite also occurs in fractures in rocks peripheral to the main zone of mineralization.

Joints, faults, and quartz veins on the 1050 level are vertical to steeply dipping and strike north-northeast, north-northwest, and west-northwest (*see* Fig. 8).

Molybdenite mineralization occurs in a number of forms on the 1050 level. The high-grade zone at the junction of the main drift and the crosscuts consists of closely spaced parallel one-quarter to one-half-inch bands of molybdenite crudely parallel to the trend of the enclosing alaskite body. One-quarter-inch rosettes of molybdenite are uniformly distributed in the alaskite. Postmineral shearing is indicated by slickensides in the molybdenite on fractures. In the east crosscut, brecciated quartz monzonite contains molybdenite in the numerous randomly oriented hairline chloritic fractures which characterize this rock. Better grades of mineralization in the east crosscut are associated with closely spaced one-eighth to one-quarter-inch quartz molybdenite veinlets in alaskites and leucocratic "quartz-eye" quartz monzonite porphyries which feature abundant sericite on fracture planes. The intensity of fracturing and veining and grade of mineralization are notably less in the biotite hornfels wallrocks.

The 850 level adit was collared in an infaulted wedge of biotite hornfels through which it passes for 300 feet (*see* Fig. 8). Beyond this, the rock type is mainly biotite quartz monzonite featuring abundant sericite and biotite on fractures. This type continues to a point 50 feet north of the easterly trending short crosscuts, from which point leucocratic quartz monzonite porphyry features only minor fracturing and quartz veining. The best mineralization intersected on the 850 level was in the east crosscut in which 2-inch-wide bands of massive molybdenite occur in alaskite and leucocratic quartz monzonite porphyry. The banding in the mineralized zone strikes northwesterly and dips moderately northward. The zone terminates sharply on its eastern end against a northeast-striking fracture plane.

Halfway between the portal and face of the 850 level drift, a 10-foot-wide dyke of fine-grained light-grey biotite quartz monzonite intrudes the coarser-grained more leucocratic biotite quartz monzonite. This dyke rock, also seen in several drill holes, consists of 2-millimetre grains of quartz, plagioclase, and potash feldspar. This type may represent a later, nearly postmineral intrusive phase since it contains only trace amounts of molybdenite.

WORK DONE: Underground workings surveyed; underground geological mapping, 1 inch equals 20 feet on the 850 and 1050 levels; road construction, 1 mile; underground work, 2,570 feet on Lee 47 and 48; underground diamond drilling, 13 holes totalling 2,241 feet on Lee 47 and 48.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1964, pp. 36–39; 1968, pp. 61–63; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 68.

BRITISH COLUMBIA MOLYBDENUM MINE (No. 93, Fig. C)

By B. M. Dudas

LOCATION: Lat. 55°25′ Long. 129°25.5′ (103P/6W)
The property is on Patsy Creek, the east fork of Lime Creek, and is 5 miles southeast of the head of Alice Arm Inlet, at elevation 2,000 feet.

CLAIMS: The property consists of 99 full and fractional mineral claims, of which the key mining claims are PATRICIA 1 to 5.

ACCESS: From Prince Rupert by boat or pontoon-equipped aircraft. Local freight is handled by coastal shipping and off-loading to a company barge at Alice Arm. All other freight supplies and the shipping of concentrate are done by barge from Vancouver.

OWNER: BRITISH COLUMBIA MOLYBDENUM LIMITED, 810, 402 West Pender Street, Vancouver 3; mine office, Kitsault.

METAL: Molybdenum (*see* Table 1 for production).

Work done: Mining is by open-pit method. Molybdenite concentrate is produced by flotation. At December 31, employment was at 210, including staff and hourly personnel. The company maintains a town at Kitsault. Married personnel are living in the townsite and the single-status employees are housed in multiple-trailer units. A medical doctor is now residing on the property. During the year a new recreational centre with a three-sheet curling-rink was completed, a new four-room school and a 54-space trailer court were added to the existing community, and a new 10-yard front-end loader was added to the existing fleet of equipment.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 69.

MOLY (No. 124, Fig. C)

By N. C. Carter

Location: Lat. 55°28′ Long. 129°20′ (103P/6W)
South of the Illiance River, 5 miles east of Alice Arm.

Claims: Thirty-eight MOLY, 4 ED, 24 ROC.

Access: By helicopter from Alice Arm or trail from the British Columbia Molybdenum water intake at Clary Lake.

Owner: BELL MOLYBDENUM MINES LIMITED, 3196 Westmount Place, West Vancouver.

Metal: Molybdenum.

Description:

Isolated outcrops of biotite hornfels, similar to the hornfels bordering the quartz monzonite porphyry stock in the central part of the property, were located some 2,000 feet east of Clary Lake during a prospecting programme in 1969.

This zone, which is situated along the northwestern edge of a mesa of Tertiary basalt, was further investigated by trenching and sampling in 1970. A trench, several hundred feet south of a small lake east of Clary Lake, cuts across well-indurated brown biotite hornfels which displays some secondary "bleaching" or sericite alteration adjacent to quartz-filled fractures. Farther east, the zone appears to decrease in intensity, and only interstitial secondary biotite was noted in the matrix of argillaceous siltstones and greywackes.

Work done: Geological mapping, 1 inch equals 100 feet and geochemical soil survey, 60 samples, on Moly 61 to 64 and Roc 19.

References: *Minister of Mines, B.C.,* Ann. Rept., 1967, pp. 44–47; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 69.

KITSUMKALUM LAKE

HOPE SILVER (No. 12, Fig. C)

Location: Lat: 54°58′ Long. 128°53′ (103I/15W)
At approximately 1,150 feet elevation, southeast of Sand Lake, near Belway Creek, 35 miles north of Terrace.

Claims: BB, BOX, BOB, GRISSLY, BEN, AG, HOPE, 15 claims in all.

Access: By road from Terrace, 40 miles.

Owner: KLEANZA MINES LTD., Box 580, Terrace.

Metals: Silver, copper, lead, zinc.

Work done: Trenching, approximately 500 cubic feet on Hope 1 and 2; stripping, approximately 2,000 square feet on Bob 1.

References: *Minister of Mines, B.C.,* Ann. Rept., 1966, p. 51; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 70, 71; *Geol. Surv., Canada,* Mem. 205, pp. 11–13; Mem. 329, p. 73.

ORO (No. 109, Fig. C)

LOCATION: Lat. 54°48′ Long. 128°57′ (103I/15W)
On the north side of Mayo Creek, 32 miles northwest of Terrace.

CLAIMS: Six ORO.

ACCESS: By helicopter from Terrace.

OWNER: STEVE PISKULSKI, Terrace.

METALS: Gold, silver, lead.

DESCRIPTION: Two hundred feet of drifting and crosscutting was done in 1962 by Kootenay Base Metals Limited to explore a mineralized shear zone in Bowser sediments.

WORK DONE: Old trenches were cleaned out and sampled.

NOBLE (No. 110, Fig. C)

LOCATION: Lat. 55°48′ Long. 128°55′ (103I/15W)
North of Mayo Creek, between elevations of 1,600 and 2,600 feet.

CLAIMS: NOBLE, totalling 15.

ACCESS: Along the Nass River logging-road, 25 miles north of Terrace; thence 5 miles west on a branch road.

OWNER: STEVE PISKULSKI, Terrace.

METALS: Silver, gold, lead, antimony, copper.

DESCRIPTION: Four vein structures occur in and near an intrusive sedimentary contact.

WORK DONE: Old workings were cleaned out.

REFERENCE: *Geol. Surv., Canada,* Mem. 329, pp. 74, 75.

RAY (No. 111, Fig. C)

LOCATION: Lat. 54°48′ Long. 128°45′ (103I/15E, 15W)
On Hall Creek, 1 mile east of Rosswood on Kitsumkalum Lake.

CLAIMS: Four RAY.

ACCESS: By road from Terrace to Rosswood, then by trail to the property.

OWNER: STEVE PISKULSKI, Terrace.

METALS: Copper, molybdenum.

DESCRIPTION: Veins in a porphyritic granitic rock carry chalcopyrite and molybdenite.

WORK DONE: A trail was constructed to the showings and some trenching was done.

KEN (No. 112, Fig. C)

LOCATION: Lat. 54°47′ Long. 128°46′ (103I/15W)
On the east shore of Kitsumkalum Lake, 1 mile south of Rosswood.

CLAIMS: Two KEN.

ACCESS: By 25 miles of road from Terrace.

OWNER: STEVE PISKULSKI, Terrace.

METALS: Copper, gold, silver, molybdenum.

DESCRIPTION: The claims include the old Belway and Rex showings. Small shear and fracture zones in Bowser metasedimentary rocks contain some bornite. A logging-road, currently being constructed, will obliterate the three original adits.

WORK DONE: Three adits were cleared of rockfall and sampled.

REFERENCE: *Geol. Surv., Canada,* Mem. 329, p. 74.

HAWK, BEAR (No. 113, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°49′ Long. 128°39′ (103I/15E)
On the north slope of Maroon Mountain, at an elevation of 4,500 feet.

CLAIMS: One Crown-granted claim (Lot 6792) and three recorded claims.

ACCESS: By helicopter, 25 miles north from Terrace.

OWNER: C. L. M. GIGGEY, Apt. 601, 5411 Vine Street, Vancouver 13.

METALS: Gold, silver.

DESCRIPTION: A quartz vein, containing chalcopyrite, pyrite, and sphalerite, occurs in northeast-striking, south-dipping bedding plane shears in greywackes stratigraphically below a conglomerate bed between 120 and 250 feet thick. The vein, which varies in width from 6 inches to 3 feet, has been exposed in a number of old adits and open cuts over a strike length of 1,000 feet. Aplitic and basic dykes are closely associated with the quartz veins.

WORK DONE: Some drilling and blasting were done along with a limited amount of regional geochemistry and prospecting.

REFERENCE: *Geol. Surv., Canada,* Mem. 329, pp. 75, 76.

QUARTZ SILVER (No. 94, Fig. C)

LOCATION: Lat. 54°43′ Long. 128°54′ (103I/10W)
At 1,000 feet elevation, south of Nelson River, 5 miles west of the south end of Kitsumkalum Lake.

CLAIMS: Forty claims, including the QUARTZ SILVER, QF.

ACCESS: By Nass River logging-road, 20 miles from Terrace.

OWNERS: JOHN APOLCZER and R. H. BATES, Terrace.

METALS: Silver, lead, zinc, copper.

DESCRIPTION: A dacite porphyry contains varying amounts of pyrite, sphalerite, galena, and chalcopyrite.

WORK DONE: Two X-ray diamond-drill holes totalling 170 feet were drilled. Geochemical sampling was conducted over the previously established grid.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 71, 72.

LAKELSE

LADY LUCK (No. 114, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°23′ Long. 128°40′ (103I/7E)
On the east slope of Mount Johnstone, at an elevation of 800 feet.

CLAIMS: Forty LADY LUCK, 36 GABE, 20 KENAB, 40 MAYNER'S FORTUNE, 20 HAL.

ACCESS: By road, 22 miles south from Terrace.

OPERATOR: NITTETSU MINING CO. LTD., 404, 470 Granville Street, Vancouver 2.

METALS: Copper, molybdenum, zinc, lead, iron, limestone.

DESCRIPTION:

Much of the original trenching on the property was done in the vicinity of the number one claim post of the Lady Luck 1, 2, 3, and 4 claims. A number of trenches expose northerly trending mineralized zones in skarn and sills of biotite diorite. Adjacent to the claim posts, two 4-foot-wide shear zones in skarn contain massive stringers of fine-grained garnet, pyrite, magnetite, chalcopyrite, and sphalerite. A chip sample across one of these zones assayed: Gold, trace; silver, trace; copper, 0.88 per cent; lead, trace; zinc, 7.8 per cent; iron, 30.6 per cent; and a trace of molybdenum. Two hundred feet to the west, epidote-veined, medium-grained diorite contains rosettes of molybdenite.

Eight hundred feet south of the claim posts and trenched area, crystalline white limestone occurs along the eastern edge of the skarn zone.

A further 200 feet south, a 100-foot-long trench crosscuts several northerly striking, vertically dipping lenses of near massive magnetite, pyrite, chalcopyrite, sphalerite, and molybdenite. Much of the trench is in skarn, which is cut by a 20-foot sill of diorite near the central part of the trench. Banding in the sulphide lenses adjacent to the diorite was noted. A few postmineral basic dykes were noted in drill core from the general area of the trench. A chip sample across the 100-foot length of the trench assayed: Iron, 14.2 per cent; gold, trace; silver, trace; copper, 0.28 per cent; lead, trace; zinc, 0.67 per cent.

WORK DONE: A transit survey of claims and grid-lines was completed. Geological mapping and a magnetometer survey were carried out on four claims. Some trenching was done and 3,000 feet of AQ core was drilled.

KITIMAT

BOWBYES (No. 35, Fig. C)

LOCATION: Lat. 54°03.9–06′ Long. 128°43.8–45′ (103I/2E)
Between 300 and 2,500 feet elevation on east slope of Claque Mountain, 4 miles northwest of Kitimat.

CLAIMS: BOWBYES 1 to 16; JOAN 1, 2.

ACCESS: By road from Kitimat, 4 miles.

OWNER: BOWBYES MINES LTD., 1767 Ingledew Street, Prince George.

METALS: Copper, iron.

DESCRIPTION: The property is underlain by Mesozoic volcanic rocks, near their contact with Coast Intrusions.

WORK DONE: Magnetometer survey, 2½ line-miles covering Bowbyes 7 to 16 and Joan 2; road construction, 1 mile; trenching, 170 feet on Bowbyes 7 to 12 and Joan 2; stripping, 250 square yards on Bowbyes 2, 7, 9, and 13; percussion drilling, 185 holes totalling 555 feet on Bowbyes 8, 10, and 14 and Joan 2.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 72.

PORCHER ISLAND

LOR (No. 49, Fig. C)

LOCATION: Lat. 53°53′ Long. 130°26′ (103G/16W)
South end of Porcher Island, on the east side of Porcher Inlet.

CLAIMS: LOR.

ACCESS: By float plane or boat from Prince Rupert, 40 air-miles.

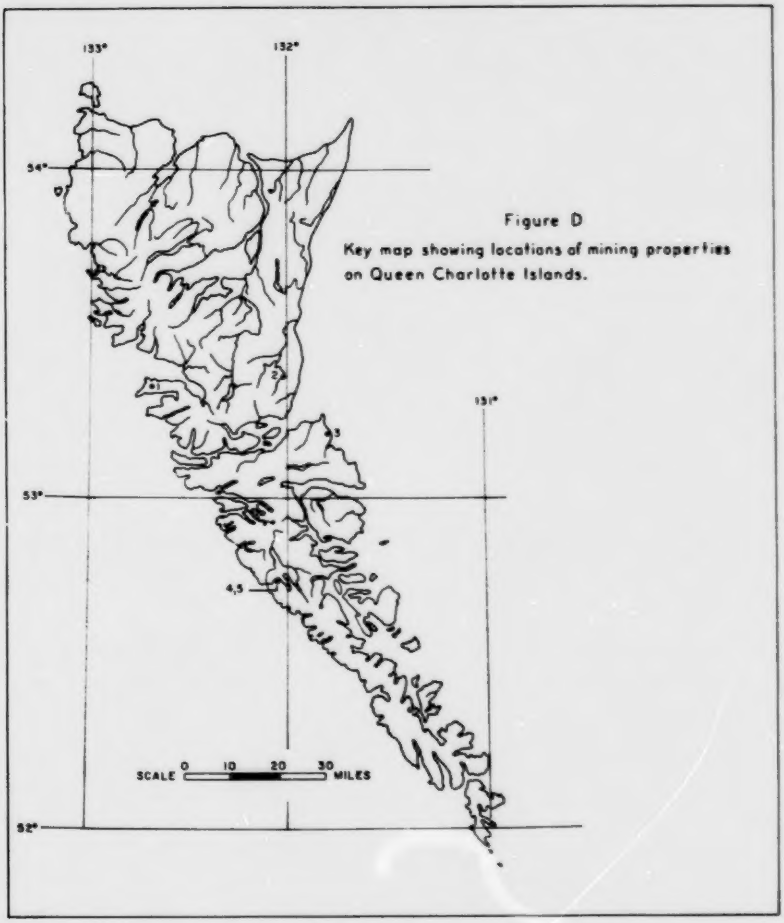
OPERATOR: M. A. ROED GEOLOGICAL EXPLORATIONS LTD., 10620 Rowland Road, Edmonton, Alta.

METAL: Molybdenum.

DESCRIPTION: Molybdenite occurs in fractures and shear zones in several localities along Billy Creek adjacent to a granite-metavolcanic contact.

WORK DONE: Prospecting and geological mapping of the entire claim block.

REFERENCE: Assessment Report 2706.



133°
132°
131°
54°
53°
52°
1
2
3
4,5
SCALE 0 10 20 30 MILES

Figure D
Key map showing locations of mining properties on Queen Charlotte Islands.

KEY TO PROPERTIES ON INDEX MAP, FIGURE D

1 **BEV**, page 100.
2 **MINO**, page 100.
3 **IXL**, page 100.
4 **TASU MINE**, page 101.
5 **DELA-BLUJAY**, page 101.

GRAHAM ISLAND

BEV (No. 1, Fig. D)

LOCATION: Lat. 53°20.5′ Long. 132°40.5′ (103F/7E)
At approximately 2,000 feet elevation, on the north side of Kano Inlet, 3 miles southeast of Cone Head.

CLAIMS: BEV 1 to 14.

ACCESS: From Sandspit by helicopter, 37 miles.

OWNER: TEXAS GULF SULPHUR COMPANY, 701, 1281 West Georgia Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Very sparse chalcopyrite and molybdenite occur along fracture planes in an unaltered feldspar porphyry stock intruding diorite.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals one-quarter mile; geochemical silt survey, 100 samples covering Bev 1 to 14.

MINO (No. 2, Fig. D)

LOCATION: Lat. 53°22.3′ Long. 132°00.5′ (103F/8E)
At approximately 500 feet elevation, on the Tlell River, about 8 miles north-northeast of Queen Charlotte City.

CLAIMS: MINO 1 to 124, NADISA 1 to 14, LUCIA 1 to 24, ANNA 1 to 7, CAROL 1 to 6, AIDA 1 to 70.

ACCESS: From Queen Charlotte City by road, 8 miles.

OPERATOR: ADANAC MINING AND EXPLORATION LTD., 910A, 1111 West Hastings Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Disseminated pyrite with minor traces of molybdenite and chalcopyrite occurs in contact area of diorite intrusive into hornfels.

WORK DONE: Surface geological mapping, 1 inch equals 40 feet on Mino 1, 2, 5, 6, and 49; road construction, 1 mile (access from highway); surface diamond drilling, two holes totalling 508 feet on Mino 1 and 49.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 72; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 72, 73; Assessment Reports 2046A, 2046B.

MORESBY ISLAND

IXL (No. 3, Fig. D)

LOCATION: Lat. 53°12′ Long. 131°47.5′ (103G/4W)
Along the east coast of Moresby Island, 3 miles south of Sandspit.

CLAIMS: IXL 1 to 6, 8, 10, 15 to 25, 27.

ACCESS: By the Sandspit–Copper Bay road, which passes through the eastern margin of the property.

OWNER: TEXAS GULF SULPHUR COMPANY, 701, 1281 West Georgia Street, Vancouver 5.

METAL: Copper.

WORK DONE: A total of 832 soil samples was collected for analysis.

REFERENCE: Assessment Report 2777.

TASU MINE (No. 4, Fig. D)

By B. M. Dudas

LOCATION: Lat. 52°45.5′ Long. 132°03′ (103C/16E)
On the south side of Tasu Sound, Moresby Island, Queen Charlotte Islands.

CLAIMS: Twenty-one Crown-granted and 83 recorded mineral claims (includes those listed under Dela-Blujay).

ACCESS: By pontoon-equipped aircraft or power-boat from Sandspit. Local freight is handled by coastal freighters from Vancouver and Queen Charlotte City.

OWNER: WESFROB MINES LIMITED, 504, 1112 West Pender Street, Vancouver 1; mine office, Tasu.

METALS: Iron, copper (*see* Table 1 for production).

WORK DONE:

The mine extends from sea-level to some 3,000 feet elevation. Mining is by open-pit method, on five-day schedule at 8,000 tons per day of ore and 8,000 tons per day of waste. Iron and copper concentrates are produced by flotation and magnetic separation.

At December 31, employment was 214 on surface and six underground. The company maintains a townsite for married personnel and hotel accommodation is available for single-status employees. A new single-men's residence to house 100 men was completed at year-end. A medical doctor and full-time nurse are residing in the townsite.

A new Cat 988 front-end loader and a 12-ton mobile hydraulic crane were purchased during the year.

The Dela-Blujay exploration adit of 10 by 12-foot dimension was started in August. The portal was collared at 25 feet above the high-water mark, some 3,500 feet southwest of the concentrator building. At year-end the progress was 1,560 feet in good ground (*see* Dela-Blujay).

The 4,160-volt electric shovel power-cable was routed through the haulage adit, up the ventilation raise, along the drainage adit, and up a bore hole to No. 3 zone pit. A switch house and three 100-kva. 4,160–600-volt transformers were installed in the pit, also one 88-horsepower Flyght pump and one 25-horsepower prosser pump were installed.

Installed by the contractor were the following:

One 178-kva. three-phase 575-volt diesel-driven generator.
One 40-kva. three-phase 575–120/208-volt transformer.
One 40-horsepower ventilation fan.
One 20-horsepower pump.
One 20-horsepower welder.

At the primary crusher a three-conductor 4/0 A.W.G. cable and a section of square D motor-control centre at No. 1 conveyor take-up tower were installed. A 100-horsepower ventilation fan and two electric heaters were also installed.

In the secondary crusher building, a 30-horsepower dust-collecting fan and a 15-horsepower sand pump were installed.

In the concentrator, a 5-horsepower screen, a 3-horsepower conveyor, and two 30-horsepower pumps were installed.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 73.

DELA-BLUJAY (No. 5, Fig. D)

LOCATION: Lat. 52°45′ Long. 132°04′ (103C/16E)
Between sea-level and 2,400 feet elevation one-half mile south-southeast of Horn Island, Tasu Sound.

CLAIMS: DELA Fraction (Lot 2995), BLUJAY Fraction (Lot 2999), FEO No. 1 (Lot 2996), FEO No. 3 (Lot 3004), FEO No. 5 (Lot 3007) Crown-granted claims and FEO 4; WEST 2, 3, 15, 17; TERRY recorded claims.

ACCESS: From Tasu by land and water, 1 mile.

OWNER: WESFROB MINES LIMITED, 504, 1112 West Pender Street, Vancouver 1; mine office, Tasu.

METALS: Iron, copper.

DESCRIPTION: Diorite porphyry is emplaced between Karmutsen volcanics and overlying sediments. The diorite is altered to skarn (chlorite, epidote, and garnet) and is host to magnetite and chalcopyrite mineralization. Volcanics and sediments act as host to a lesser degree. Habit varies from lenticular to sheet-like.

WORK DONE: Topography and underground workings mapped; surface geological mapping, 1 inch equals 100 feet on Feo 3 to 5, West 2, 3, 15, 17, and Terry claims; underground geological mapping, 1 inch equals 20 feet on Dela Fraction, Blujay Fraction, and Feo 1 claims, magnetometer survey, 18 line-miles covering Feo 3 to 5, West 2, 3, 15, 17, and Terry claims; road construction, 0.4 mile (access road to adit); underground work, 1,560 feet on Dela Fraction, Blujay Fraction, and Feo 1.

KIMSQUIT RIVER

KIM (No. 36, Fig. C)

LOCATION: Lat. 53°08′ Long. 127°20′ (93E/3W)
At approximately 2,000 feet elevation, 60 miles north-northwest of Bella Coola on the northwest side of the Kimsquit River, 2 miles from Kimsquit Lake.

CLAIMS: KIM 1 to 4.

ACCESS: By float plane from Bella Coola, 60 miles.

OWNER: KERR ADDISON MINES LTD., 405, 1112 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur in quartz veins and fractures in a quartz monzonite intrusion. The quartz monzonite invades both Coast Range granodiorite and metavolcanic rocks.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet on Kim 2 to 4; surface diamond drilling, one hole totalling 188 feet on Kim 3.

RED BIRD (CAFB) (No. 66, Fig. C)

LOCATION: Lat. 53°18′ Long. 127°02′ (93E/6E)
At approximately 5,000 feet elevation, along the shores of Haven Lake and directly opposite Bone Mountain.

CLAIMS: CAFB, totalling 239.

ACCESS: By aircraft from Burns Lake a distance of 80 miles, or from Smithers a distance of 105 miles.

OWNER: Ashfork Mines Limited.

OPERATOR: PHELPS DODGE CORPORATION OF CANADA LIMITED, 404, 1112 West Pender Street, Vancouver 1.

METALS: Molybdenum, copper.

DESCRIPTION: Mineralization consists of molybdenite and very minor chalcopyrite as disseminations and fracture-filling in a silicified, fractured, and kaolinized quartz monzonite plug. Most of the chalcopyrite lies in peripheral fractures in Hazelton volcanics.

Work done: Renewed claim-lines and cleaned up lines and posts.

References: *Minister of Mines, B.C.,* Ann. Repts., 1964, pp. 57, 58; 1965, p. 88; 1966, pp. 112–116; 1967, p. 114; 1968, p. 142.

CHARLOTTE LAKE

MM (No. 59, Fig. F)

Location: Lat. 52°23′ Long. 125°28.5′ (93C/6W)
At the west end of Kappan Lake, at 3,500 feet elevation.

Claims: MM, totalling 41.

Access: From Nimpo Lake by road, 16 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metals: Molybdenum, copper.

Description: Molybdenite and chalcopyrite occur as disseminations and along joints and fractures in quartz monzonite, alaskite, and aplite.

Work done: Induced polarization survey, 9 line-miles; surface diamond drilling, three holes totalling 300 feet.

References: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 72; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 74; Assessment Report 1848.

TEL (No. 60, Fig. F)

Location: Lat. 52°17–19′ Long. 125°35.5–39.5′ (93C/5E)
At approximately 5,000 feet elevation, between Baldy Lake and Telegraph Creek, about 8 miles south of the Hotnarko River.

Claims: TEL, totalling approximately 60.

Access: From Nimpo Lake by aircraft, 20 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Work done: Surface diamond drilling, eight EX holes totalling 850 feet on Tel 12, 19 to 23, 31.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 74; Assessment Reports 1955, 1958.

OMINECA MINING DIVISION

KIMSQUIT RIVER

RED BIRD (CAFB) (No. 66, Fig. C)

Location: Lat. 53°18′ Long. 127°02′ (93E/6E)
See report on this property, page 102.

OOTSA LAKE

WELL (No. 22, Fig. C)

Location: Lat. 53°42′ Long. 126°15′ (93E/9E)
Five miles south of Ootsa Lake.

Claims: WELL 1 to 64.

Access: By helicopter from Burns Lake, 40 miles.

Owner: JOREX LIMITED, 85 Richmond Street West, Toronto, Ont.

Description: Tertiary basalts underlie much of the claim group.

Work done: Magnetometer survey, 10 line-miles on Well 5 to 14, 20 to 22, 24, 26, 28, and 37 to 48 claims; geochemical soil survey, 25 samples on Well 38 claim.

JOAN, SONY (No. 67, Fig. C)

LOCATION: Lat. 53°43′ Long. 127°03′ (93E/11E, 10W)
Located 4 miles southeast of Huckleberry Mountain and 6 miles north of Troitsa Peak.

CLAIMS: JOAN 1 to 80, SONY 121 to 140.

ACCESS: By float plane from Smithers, or by logging-road from Nadina River.

OPERATOR: MITSUI MINING AND SMELTING COMPANY, LIMITED, 2010, 505 Burrard Street, Vancouver 1.

DESCRIPTION: Sulphide mineralization is associated with small Late Jurassic granite stocks cutting Hazelton volcanics.

WORK DONE: Airborne magnetometer and airborne electromagnetic surveys; line-cutting.

REFERENCES: Assessment Reports 2344 (line-cutting), 2377.

FAB (No. 87, Fig. C)

By N. C. Carter

LOCATION: Lat. 53°32′ Long. 127°14′ (93E/11E)
South of Troitsa Lake on a tributary of Coles Creek, between elevations of 3,800 and 5,000 feet.

CLAIMS: FAB, totalling 47.

ACCESS: By road from Houston to Tahtsa Lake, 70 miles; thence 10 miles south by helicopter.

OWNER: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum, lead, zinc.

DESCRIPTION:

A stock of quartz monzonite porphyry, roughly 2,500 feet in diameter, intrudes Jurassic volcanic and sedimentary rocks. Related to the quartz monzonite porphyry are extrusive equivalents, including rhyolite tuffs and breccias, and northeast-trending dykes of feldspar biotite porphyry and quartz diorite.

Pyrite mineralization extends outward from the stock a distance of 4,000 feet. Chalcopyrite occurs in quartz veinlet stockworks in most of the intrusive rock types. Minor molybdenite has been noted in the quartz veinlets in the quartz monzonite porphyry. Galena and sphalerite occur in fractures in thin-bedded tuffs in the south-central part of the claims.

WORK DONE: Geological mapping and silt, soil, and water sampling for geochemical analysis were carried out on the Fab 41 to 59 claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 141; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 98; Assessment Reports 1670, 2003, 2664.

LEN (No. 83, Fig. C)

By N. C. Carter

LOCATION: Lat. 53°41′ Long. 127°10′ (93E/11E)
At approximately 3,400 feet elevation, near Huckleberry Mountain, between Tahtsa Reach and Sweeney Lake, 50 miles southwest of Houston.

CLAIMS: LEN 1 to 58, 60 to 84.

ACCESS: By road from Houston, 80 miles.

OWNER: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

METALS: Copper, molybdenum.

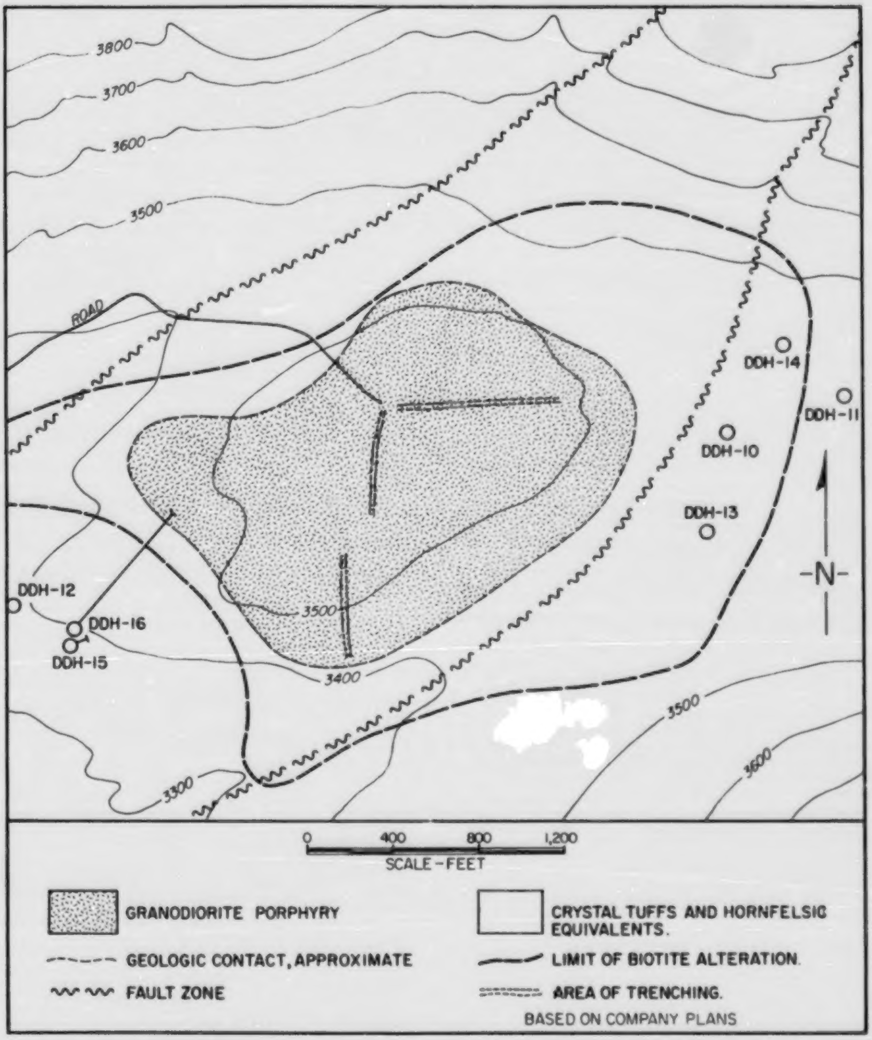

3800
3700
3600
3500
ROAD
DDH-14
DDH-11
DDH-10
DDH-13
DDH-12
DDH-16
DDH-15
3500
3400
3300
3500
3600
-N-
0
400
800
1,200
SCALE-FEET
GRANODIORITE PORPHYRY
CRYSTAL TUFFS AND HORNFELSIC EQUIVALENTS.
GEOLOGIC CONTACT, APPROXIMATE
LIMIT OF BIOTITE ALTERATION.
FAULT ZONE
AREA OF TRENCHING.
BASED ON COMPANY PLANS

Figure 9. Kennco Explorations, (Western) Limited, geology of part of the Len claims.

DESCRIPTION:

The claims were located south of Huckleberry Mountain in 1962 following the discovery of copper-molybdenum mineralization associated with a small granodiorite porphyry plug at the base of the mountain. Active exploration work was conducted through 1964 and results of this work and the geology of the property were described by J. M. Carr in the 1964 Minister of Mines and Petroleum Resources Annual Report. The following description is based on a short visit to the property spent mainly examining drill core recovered from the 1970 drilling programme. Figure 9 is a generalized geological sketch of the area around the granodiorite porphyry plug. Drill holes indicated are those completed in 1970. Locations of earlier drill holes are shown on an earlier map (Carr, 1964).

Fragmental volcanic rocks of the Hazelton Group are well exposed on the south slope of Huckleberry Mountain and on low ridges near the south boundary of the property. The zone of copper and molybdenum mineralization is situated in the southwestern part of the property and is centred about an elliptical plug of granodiorite porphyry, oriented with its long axis in a northeast direction and measuring 2,200 by 1,400 feet. The plug underlies a low hill, but bedrock exposures are mainly confined to bulldozer trenches.

As exposed in the trenches in the central part of the plug, the intrusive is a light-grey crowded porphyry with phenocrysts constituting 50 per cent of the rock. These include 2 to 4-millimetre phenocrysts of euhedral, fresh, zoned plagioclase (An_{30-40}), and subsidiary 2-millimetre plates and books of fresh biotite and 2-millimetre anhedral quartz phenocrysts, all set in a fine-grained matrix of quartz, feldspar, and biotite. Locally the rock has a pinkish cast due to the presence of potash feldspar in the matrix and marginal to narrow quartz veinlets.

Biotite may constitute 10 to 15 per cent of the rock by volume, occurring both as primary, fresh 1 to 2-millimetre plates and books, and as fine-grained clusters of secondary biotite, partly chloritized, altering from original hornblende.

Porphyry dykes cut the volcanic rocks marginal to the plug as seen in drill core from holes east of the intrusive. These biotite feldspar porphyries, while of similar composition, are finer grained than the main intrusive, consisting mainly of crowded 2-millimetre phenocrysts of unzoned plagioclase (An_{30}) and 1-millimetre biotite plates set in a fine-grained quartz-rich matrix. Little potash feldspar was seen except that marginal to quartz-filled fractures. Plagioclase exhibits a fair degree of sericitic and argillic alteration and biotite is mostly altered to chlorite.

Intrusion of the granodiorite porphyry has caused hornfelsing of the adjacent fine-grained crystal tuffs. These rocks are mainly light to dark grey, but are locally tinged brown due to the selective development of secondary biotite within an oval zone extending outward from the plug a distance of up to 600 feet (*see* Fig. 9). Typically, the hornfelses contain 2-millimetre crystal fragments of plagioclase in a very fine-grained mosaic of quartz, plagioclase, and biotite. Abundant fine-grained biotite and actinolite were noted filling fractures in a few drill sections. Light-grey hornfelsed volcanic rocks consist mainly of quartz, sericite, and carbonate and contain abundant disseminated pyrite. The hornfelses are well fractured, with many of the fractures filled with quartz and rimmed by bleached zones up to one-quarter inch wide. These bleached haloes are made up of very fine-grained quartz, sericite, carbonate, and some potash feldspar or granophyre.

Lamprophyre dykes, fine grained and dark green, intrude all rocks in the area.

Northeast and northwest linear features, often marking the course of creeks, are common on air photographs covering the Huckleberry Mountain area, and some of these represent faults. The northwest faults appear to be terminated by the northeasterly ones. As suggested by Carr (1964), the porphyry plug was apparently localized by the two northeast faults which bound it closely on the north and south (*see* Fig. 9). These faults also caused fracturing of the volcanic rocks, which was intensified by the intrusion of the porphyry plug. The major fracture directions in the volcanic rocks and the porphyry plug also trend northeast and northwest.

Copper and molybdenum mineralization is associated with the granodiorite porphyry plug and, in particular, the hornfelsed rocks peripheral to the intrusive. The best mineralized sections from the 1970 drilling programme were seen in core from holes drilled in the hornfelsed rocks east of the granodiorite porphyry plug (*see* Fig. 9). Typically, these hornfelses are cut by closely spaced hairline fractures which are coated with chalcopyrite and lesser amounts of quartz and magnetite. Magnetite may also be disseminated in the matrix of the rock with pyrite. Chalcopyrite and lesser molybdenite also occur in vertical one-eighth-inch quartz veinlets which may also contain some potash feldspar. These fractures are commonly bordered by bleached zones up to one-quarter-inch wide.

Biotite feldspar porphyry dykes seen cutting hornfels in this area east of the main intrusive also are cut by one-eighth-inch vertical quartz-chalcopyrite-molybdenite veinlets. These veinlets, which may be rimmed by potash feldspar, are cut by horizontal gypsum-healed fractures. Some fluorite was also seen in fractures and chalcopyrite was noted replacing mafic minerals in one section.

In the trench area within the main intrusive, chalcopyrite occurs in 1 to 2-inch-spaced hairline fractures with quartz and minor potash feldspar and also in one-eighth to one-half-inch quartz veinlets. Magnetite is also common in fractures. Chalcopyrite also occurs as disseminations in the granodiorite porphyry.

A pyrite halo extends outward from the granodiorite porphyry a distance of up to 2,000 feet, and is marked by a gossan on the south slope of Huckleberry Mountain. This gossan occurs in an east-trending zone some 2 miles long, with the porphyry plug situated near the western end of the zone. At the eastern end of the gossan, an elliptical north-south zone of pyrite-chlorite alteration in volcanic rocks measures 3,000 by 2,000 feet and includes an inner quartz-sericite-pyrite alteration zone. Soils overlying this zone of alteration are anomalous in copper and molybdenum and a magnetic high is also centred on this zone. Two drill holes intersected dark-grey tuffs, locally biotitic, which contain abundant pyrite in hairline fractures with chlorite and in one-quarter to one-half-inch quartz veinlets which also contain very minor chalcopyrite.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 5.3 line-miles; magnetometer survey, 8.5 line-miles; geochemical survey, 300 soil samples, 87 silt samples, and 84 rock samples; road construction, 2½ miles through central part of the property; trenching, 2,500 feet; surface diamond drilling, nine holes totalling 4,557 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1964, pp. 53–55; Assessment Reports 2690, 2691, 2692, 2693.

EMERALD GLACIER MINE (No. 88, Fig. C)

By W. G. Clarke

LOCATION: Lat. 53°44.5′ Long. 127°15.5′ (93E/11W)

Between elevations of 6,000 and 6,500 feet on Mount Sweeney, in the Sibola Range north of Tahtsa Lake.

CLAIMS: Mineral Lease M-15 (nine EMERALD and GLACIER Crown-granted claims) and 27 recorded claims.

ACCESS: By road from Houston, 60 miles.

OWNER: EMERALD GLACIER MINES LTD., Box 221, Terrace.

METALS: Silver, lead, zinc.

WORK DONE: The access road to the mine portals was reopened in May. The mill was rehabilitated in June. There was no exploration, development, mining, or milling done in 1970.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, pp. 110–113; 1968, p. 141; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 92, 93.

NANIKA LAKE

SET, LOST, ICE (No. 46, Fig. C)

LOCATION: Lat. 53°49.5′ Long. 127°26′ (93E/14W)
At approximately 6,000 feet elevation, 5 miles southeast of the north end of Nanika Lake, 65 miles south of Smithers.

CLAIMS: SET 12 to 16, LOST 1 to 4, ICE 1 to 5, IT.

ACCESS: From Houston by road, 73 miles.

OWNER: SIERRA EMPIRE MINES LTD., 846 West Hastings Street, Vancouver 1.

METALS: Silver, copper, lead, zinc.

DESCRIPTION: Galena, sphalerite, and pyrite occur in veins and covellite, chalcopyrite, and pyrite occur disseminated in diorite and altered Hazelton Group rocks near the diorite.

WORK DONE: Claims (Lost 3 and 4) and topography (Ice, It) mapped; surface geological mapping, 1 inch equals 300 feet on It and Ice; road construction, 1 mile; trenching, 500 feet on Ice and It.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1951, p. 118; 1952, p. 97; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 92.

NADINA LAKE

NADI (No. 21, Fig. C)

LOCATION: Lat. 53°56′ Long. 127°02′ (93E/14E)
At 3,500 feet to 4,000 feet elevation, 3 miles north of Nadina Lake.

CLAIMS: NADI 1 to 20, 28, 29.

ACCESS: By Tahtsa Lake road from Houston, 35 miles.

OWNER: JOREX LIMITED, 85 Richmond Street West, Toronto, Ont.

METALS: Copper, molybdenum.

DESCRIPTION: Large pyritic zone in Hazelton volcanics and porphyry stocks—anomalous in copper and molybdenite.

WORK DONE: Surface geological mapping, 1 inch equals one-half mile on Nadi 3 to 20 claims; geochemical survey, 100 soil samples on Nadi 7, 8, and 11 to 14 claims, and 175 silt samples covering all claims.

MH (No. 23, Fig. C)

LOCATION: Lat. 53°54–57′ Long. 126°43–44′ (93E/15E)
At approximately 4,000 feet elevation, 16 miles west-northwest of Wistaria.

CLAIMS: MH, 26 claims.

ACCESS: By helicopter from Wistaria, 16 miles.

OWNER: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

DESCRIPTION: Altered acid volcanic rocks underlie the claims. Broad areas are geochemically anomalous in zinc, lead, and silver. Magnetic patterns were used to locate the claims.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet covering 20 claims; geochemical survey, 150 soil samples over five claims.

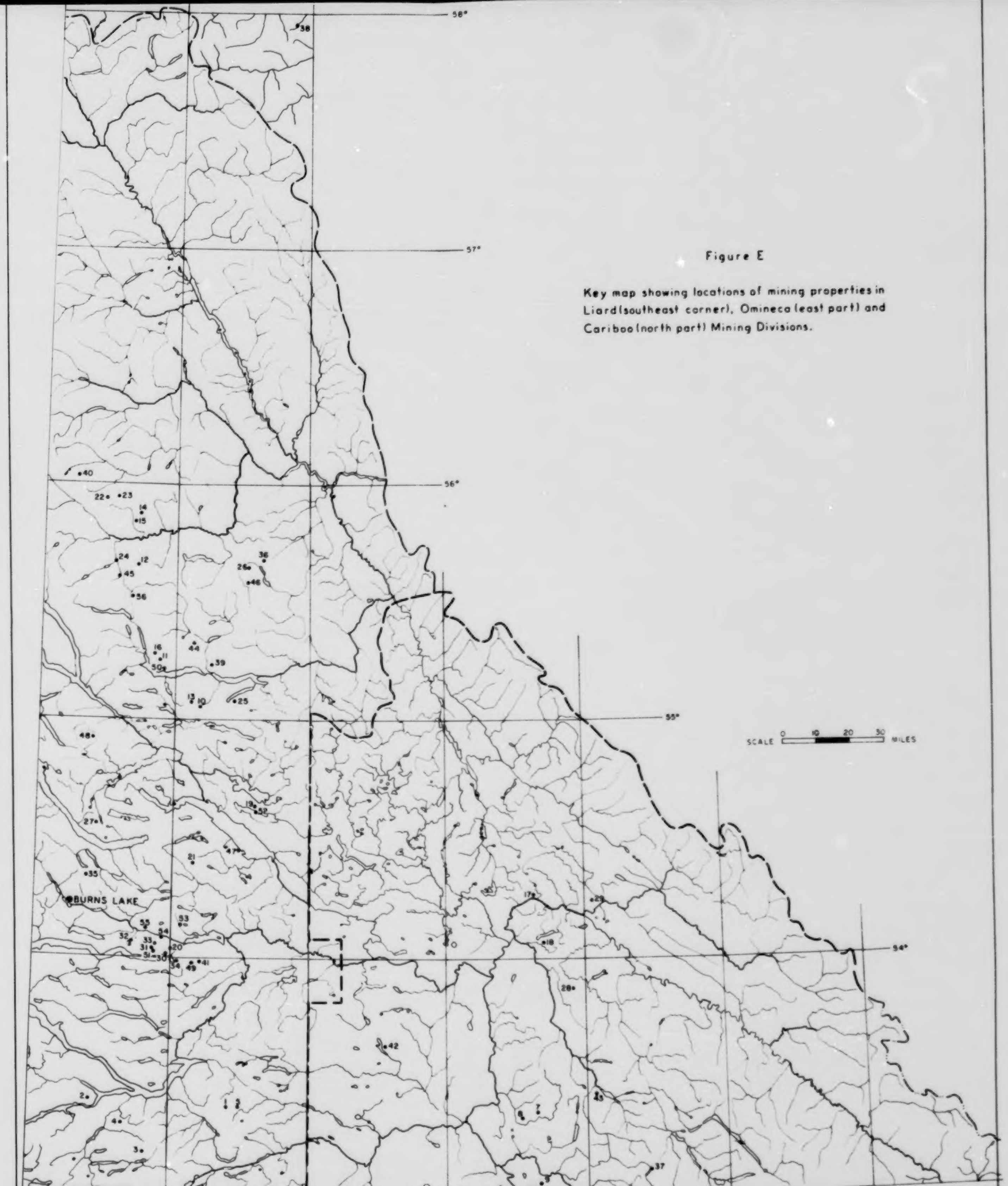


Figure E

Key map showing locations of mining properties in Liard (southeast corner), Omineca (east part) and Cariboo (north part) Mining Divisions.

KEY TO PROPERTIES ON INDEX MAP, FIGURE E

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5 C, Z, page 111.
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7 ICE, page 200.
8 JOE, page 200.
9 W, WANDA, page 200.
10 JEAN, page 178.
11 HI, page 179.
12 TWIN, page 182.
13 JW, page 178.
14 DUCK, DUKE, RONDAH, page 185.
15 DUCKLING, page 185.
16 NS, page 180.
17 NORTH BEND, ADA, page 198.
18 SALMON, TIN, CAN, page 198.
19 MERC, CIN, page 118.
20 ICE, page 113.
21 KID, page 117.
22 MISTY, page 184.
23 LORRAINE, page 184.
24 AMY, page 184.
25 CAMP, page 177.
26 BILLY, GLO, page 182.
27 BL, page 118.
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FORT, page 114.
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36 KEN (LONNIE), page 181.
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38 BLUE, page 62.
39 COL, page 178.
40 DOVE, page 185.
41 I, page 112.
42 RAY, page 199.
43 ROQ, page 199.
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45 HOUSTON, page 182.
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47 BAY, page 117
48 DIANE, page 118.
49 LODE, MINT, PEN, page 112.
COUNT, page 112.
OWL, NIT, page 113.
50 BAL, PJ, TC, A, page 179.
51 ENDAKO MINE, page 114.
52 PINCHI LAKE MINE, page 117.
53 TAT, page 113.
54 BONUS, page 116.
55 CHESS, page 116.
56 BOOM, FRANKIE, page 180.

WISTARIA

FORD (No. 24, Fig. C)

LOCATION: Lat. 53°53′ Long. 126°40′ (93E/15E)
At approximately 4,000 feet elevation, 12 miles west-northwest from Wistaria.

CLAIMS: FORD, 38 claims.

ACCESS: By helicopter from Wistaria, 12 miles.

OWNER: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

METAL: Zinc.

DESCRIPTION: Altered rhyolites of probable Hazelton age underlie the claim group. The area is geochemically anomalous in zinc, molybdenum, and, locally, silver.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet covering 30 claims; geochemical survey, 200 soil and silt samples over 10 claims.

REFERENCE: Assessment Report 2256.

LAIDMAN LAKE

L (No. 3, Fig. E)

LOCATION: Lat. 53°10′ Long. 125°09′ (93F/3E)
Two miles north of Laidman Lake.

CLAIMS: L 1 to 52, 53 Fraction.

ACCESS: By helicopter from Burns Lake, 75 miles.

OWNER: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

METALS: Copper, molybdenum.

WORK DONE: Geochemical soil survey, approximately 365 samples covering all claims.

CAPOOSE LAKE

T, TUT, CAP (No. 4, Fig. E)

LOCATION: Lat. 53°15–22′ Long. 125°10–30′ (93F/3E, 3W, 6E, 6W)
Between 3,500 and 4,500 feet elevation, in the Capoose Lake area, approximately 64 miles southeast of Burns Lake.

CLAIMS: T, TUT, CAP, totalling 1,411.

ACCESS: By float plane from Prince George a distance of 120 miles, or from the Kenney Dam a distance of 25 miles.

OWNER: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

METALS: Molybdenum, copper.

DESCRIPTION: Altered volcanics and sediments around Capoose granodiorite. Only mineralization in outcrop is chalcopyrite and molybdenite in fractures.

WORK DONE: Surface geological mapping, 1 inch equals approximately 800 feet on whole group; induced polarization surveys, 52.5 line-miles; geochemical soil survey, 12,000 samples covering whole group; 15 trenches on Cap 3, 6, 36 to 38.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 155; Assessment Reports 2577, 2578, 2655, 2780, 2781, 2782.

TETACHUCK RIVER

TET (No. 2, Fig. E)

LOCATION: Lat. 53°21–24′ Long. 125°30–36′ (93F/5E)
At approximately 3,500 feet elevation, 2½ miles north of Tetachuck River, 3 miles west of Euchu Reach.

CLAIMS: TET 1 to 75, 80 to 83, 96 to 99; TET Fraction; LAKE Fraction; HILL Fraction.

ACCESS: By fixed-wing aircraft from Burns Lake, 60 miles.

OWNER: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Pyrite with chalcopyrite and molybdenite occur where granodiorite and alaskite plugs intrude Takla volcanics.

WORK DONE: Surface reconnaissance geological mapping, 1 inch equals 500 feet on Tet 17 to 50; road construction, 3½ miles from Euchu Reach to drill-sites; trenching, 500 feet on Tet 34 and 39; surface diamond drilling, seven holes totalling 1,113 feet on Tet 34 and 39.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 154.

CHUTANLI LAKE

CHU (No. 1, Fig. E)

LOCATION: Lat. 53°21′ Long. 124°37′ (93F/7E)
At approximately 4,300 feet elevation, approximately 5 miles west of Chutanli Lake.

CLAIMS: CHU 25 to 68.

ACCESS: By helicopter from Kenney Dam, 30 miles.

OWNER: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite-molybdenite and pyrite-pyrrhotite occur as disseminated grains in hornfels and quartz veinlets which traverse metasediments and volcanics of the Hazelton Group adjacent to a Jurassic and (or) Cretaceous granodiorite intrusive body.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet; induced polarization survey, 6.2 line-miles; ground magnetometer survey, 6.2 line-miles; geochemical soil survey, 582 samples; surface diamond drilling, four holes totalling 1,216 feet on CHU 33 to 36.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 155; Assessment Reports 2535, 2673, 2674.

C, Z (No. 5, Fig. E)

LOCATION: Lat. 53°21–23′ Long. 124°28–36′ (93F/7E, 8W)
At approximately 4,500 feet elevation, at the west end of Chutanli Lake.

CLAIMS: C 1 to 126, 131 to 180; Z 1 to 56.

ACCESS: By float plane from Prince George, 85 miles, or from Kenney Dam, 25 miles.

OWNER: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

METALS: Molybdenum, copper.

DESCRIPTION: Molybdenite, minor chalcopyrite, pyrite, and pyrrhotite occur in altered sedimentary and volcanic rocks associated with a granodiorite intrusive.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on C 95 to 126, 145 to 148, 167, 168 and Z 25 to 32; induced polarization survey, approximately 52 line-miles covering C 95 to 126, 145 to 180 and Z 1 to 44; magnetometer survey, approximately 3 line-miles covering C 103, 105, 107, 109 to 114, 168; geochemical soil survey, 1,272 samples covering C 71 to 126, 145 to 180 and Z 1 to 44; nine trenches on C 109 to 112; surface diamond drilling, four holes totalling 1,116 feet on C 3 and 5 and six holes totalling 1,035 feet on C 109 and 111.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 155; Assessment Reports 2097, 2568, 2569, 2683.

ENDAKO

I (No. 41, Fig. E)

LOCATION: Lat. 53°56′–54°00′ Long. 124°45–47′ (93F/15W)
Southeast slope of Nithi Mountain.

CLAIMS: I 297 to 313, 601 to 624.

ACCESS: By logging-road from Highway 16 at Fraser Lake.

OWNER: TAURUS EXPLORATION CORPORATION, 1101, 510 West Hastings Street, Vancouver 2.

METALS: Molybdenum, copper.

DESCRIPTION: The area is largely underlain by the Topley intrusive complex.

WORK DONE: Geochemical survey.

REFERENCE: Assessment Report 2668.

COUNT (No. 49, Fig. E)

LOCATION: Lat. 53°56–57′ Long. 124°45–54′ (93F/15W)
Southern flank of Nithi Mountain.

CLAIMS: COUNT, totalling 102.

ACCESS: By road, 8 miles southeast of Glenannan.

OWNER: MERCURY EXPLORATIONS LIMITED, 700, 1281 West Georgia Street, Vancouver 5.

METAL: Molybdenum.

WORK DONE: Surface geological mapping, 1 inch equals 1 mile; induced polarization survey; surface diamond drilling.

REFERENCE: Assessment Report 2368.

LODE, MINT, PEN (No. 49, Fig. E)

LOCATION: Lat. 53°57–58′ Long. 124°49′ (93F/15W)
Between 2,800 and 4,100 feet elevation on the east flank of Nithi Mountain.

CLAIMS: LODE, MINT, PEN, MJM, FAR, totalling 67.

ACCESS: By road from Fraser Lake, 7 miles.

OWNER: NITHEX EXPLORATION AND DEVELOPMENT LTD., Box 73, Endako.

METAL: Molybdenum.

WORK DONE: Geochemical survey, 1,000 samples covering Mint, Pen, Lode, and MJM claims; road construction, 6 miles; trenching, 3,000 feet on Mint, Pen, Lode, MJM, and Far claims.

OWL, NIT (No. 49, Fig. E)

Location: Lat. 53°56′ Long. 124°50′ (93F/15W)
Smith Creek, 3 miles south of Nithi Mountain, between elevations of 3,000 and 4,000 feet.

Claims: OWL, NIT, totalling 17.

Access: From Fraser Lake village by road, 7 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metals: Molybdenum, copper.

Description: Minor molybdenite and chalcopyrite in thin quartz stringers in granodiorite to diorite nodes. Very minor potassium feldspar alteration associated with quartz stringers.

Work done: Surface geological mapping, 1 inch equals 200 feet on Owl 3 and 5; trenching, 350 feet on Owl 3 and 5.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 144; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 154; Assessment Reports 1002, 1216, 1689, 2455.

TIP (No. 34, Fig. E)

Location: Lat. 53°59′ Long. 124°57′ (93F/15W)
At approximately 3,000 feet elevation along the lower western flank of Nithi Mountain, about 1 mile east of Francois Lake.

Claims: TIP 1 to 16.

Access: By four-wheel-drive vehicle from Nithi Valley road, one-half mile.

Owner: ENDAKO MINES LTD., Endako.

Description: Over 98 per cent of the claim group is covered by overburden. Available information suggests that the area is underlain by quartz monzonite and granodiorite of Topley Intrusions.

Work done: Surface diamond drilling, four holes totalling 981 feet on Tip 5 and 11 to 13.

TAT (No. 53, Fig. E)

Location: Lat. 54°08′ Long. 124°56–58′ (93K/2W)
West side of Stern Lake, 5 miles north of Endako village.

Claims: TAT, totalling 30.

Access: By road, 5 miles northeast of Endako village.

Owner: MERCURY EXPLORATIONS LIMITED, 700, 1281 West Georgia Street, Vancouver 5.

Metal: Molybdenum.

Work done: Surface geological mapping, 1 inch equals 1 mile; induced polarization survey; surface diamond drilling.

ICE (No. 20, Fig. E)

Location: Lat. 54°03′ Long. 125°00′ (93K/2W)
At approximately 2,350 feet elevation, 7 miles southwest of the town of Fraser Lake.

Claims: ICE 1 to 70.

Access: By the Endako mine road from Highway 16, 3 miles.

Owner: LEITCH MINES LIMITED, 700, 1177 West Hastings Street, Vancouver 1.

METAL: Molybdenum.

DESCRIPTION: Molybdenite associated with granite, alaskite, and dioritic rocks of the Topley Intrusions.

WORK DONE: Seismic survey, 1 line-mile; percussion drilling, 10 holes totalling 2,060 feet on the Ice 1 to 10 claims.

BEN (No. 30, Fig. E)

LOCATION: Lat. 54°02′ Long. 125°01′ (93K/3E)
At approximately 3,000 feet elevation, near Endako.

CLAIMS: BEN 1 to 10.

ACCESS: By road from Highway 16, 6 miles.

OWNER: ENDAKO MINES LTD., Endako.

METAL: Molybdenum.

DESCRIPTION: A stockwork of quartz-molybdenite-pyrite-magnetite veins occurs in kaolinized and sericitized quartz monzonite.

WORK DONE: Ground magnetometer survey, approximately 7 line-miles and geochemical soil survey, 200 samples covering all claims; trenching, approximately 2,000 feet on Ben 5 and 6.

FORT (No. 30, Fig. E)

LOCATION: Lat. 54°02′ Long. 125°02′ (93K/3E)
Near MacDonald Lake, 6 miles south of Endako village.

CLAIMS: FORT, totalling 26.

ACCESS: By road, 6 miles south of Endako village.

OWNER: MERCURY EXPLORATIONS LIMITED, 700, 1281 West Georgia Street, Vancouver 5.

METAL: Molybdenum.

WORK DONE: Surface geological mapping, 1 inch equals 1 mile; induced polarization survey; surface diamond drilling.

ENDAKO MINE (No. 51, Fig. E)

By W. G. Clarke

LOCATION: Lat. 54°02′ Long. 125°06.5′ (93K/3E)
North of the east end of Francois Lake, 115 miles west of Prince George.

CLAIMS: Three hundred and thirty-seven claims, of which 18 are under lease, and an additional 64 claims held by Denak Mines Ltd., a wholly owned subsidiary.

ACCESS: By paved road from Highway 16, 1 mile east of the village of Endako.

OWNER: ENDAKO MINES LTD., Endako (controlled and managed by Canadian Exploration Limited, 1218, 1030 West Georgia Street, Vancouver 5).

METAL: Molybdenum (*see* Table 1 for production).

WORK DONE:

Two diamond-drill holes totalling 902 feet and two percussion-drill holes totalling 600 feet were drilled on the Endako orebody. Four diamond-drill holes totalling 2,000 feet and 12 percussion-drill holes totalling 3,378 feet were drilled on the Denak Mines Ltd. property. An electric shovel with a 13-cubic-yard bucket, ten 85-ton trucks, and one rubber-tired tractor were purchased for the pit.

In the mill, a molybdic oxide briquette plant was installed and the packaging area was modified. To supply the connected load of 90 horsepower for this plant, three single-phase 4,160–550-volt transformers were installed. A new motor-control centre was also installed.

A 45-kva. three-phase 4,160–120–208-volt transformer was installed to supply truck block-heaters. A new 15-horsepower compressor was installed in the pit shop.

The 200-horsepower primary crusher motor was replaced with a 300-horsepower motor and the motor circuit conductor size increased. The control panel was moved to a new location.

A new P & H model 2100 electric shovel was assembled and put into service. The shovel has a connected load of 750 horsepower. To bring the electric system within the requirements of the Canadian Regulations, a three-phase 5-kv. oil circuit-breaker was installed to replace the unganged air break main disconnect. A new 5-kv. outdoor O.C.B. switch-house was purchased to serve the shovel.

All open-pit electrical equipment having trailing cables has been equipped with Patton and Cooke sensing relays to protect against open and short circuits.

The 4,160-volt power-line was extended on the south side of the pit and two new portable pumps of 15 and 60 horsepower were acquired for use in the pit.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1965, pp. 136–138; 1966, p. 117; 1967, pp. 114, 115; 1968, p. 142; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 153, 154.

NU, ELK (No. 31, Fig. E)

LOCATION: Lat. 54°03′ Long. 125°07′ (93K/3E)
At approximately 3,100 feet elevation, 1½ miles northwest of Endako mine.

CLAIMS: NU, ELK, DIS, DAT, DEER, totalling 64.

ACCESS: By road from Highway 16, 6 miles.

OWNER: Denak Mines Ltd.

OPERATOR: ENDAKO MINES LTD., Endako.

METAL: Molybdenum.

DESCRIPTION: A stockwork of quartz-molybdenite-pyrite-magnetite veins occurs in kaolinized and sericitized quartz monzonite. Aplite, quartz-feldspar porphyry, and basalt dykes intrude the quartz monzonite.

WORK DONE: Ground magnetometer survey, approximately 4 line-miles, and geochemical soil survey, 180 samples covering Dat 407 to 412, Dat 4, 5, and 413 Fractions, and Nu 7 to 10; surface diamond drilling, four holes totalling 2,000 feet on Elk 7 and 8 and Nu 2 and 5; percussion drilling, 12 holes totalling 3,378 feet on Dat 408 to 410 and Dat 4 Fraction; road construction, 2 miles.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 115; 1968, p. 143; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 153.

OVAL (No. 33, Fig. E)

LOCATION: Lat. 54°04′ Long. 125°07′ (93K/3E)
At approximately 3,000 feet elevation, just north of Endako mine.

CLAIMS: OVAL 1 to 8.

ACCESS: By road from Highway 16, 3 miles.

OWNER: ENDAKO MINES LTD., Endako.

DESCRIPTION: Interpretive surface geology indicates that mineral claim group straddles the inferred contact of medium-grained leucocratic Casey alaskite and coarse-grained Endako quartz monzonite of Topley Intrusions.

WORK DONE: Ground magnetometer survey, approximately 4 line-miles, and geochemical soil survey, 165 samples covering all claims.

REFERENCE: Assessment Report 2408.

BONUS (No. 54, Fig. E)

Location: Lat. 54°05′ Long. 125°03–04′ (93K/3E)
Two miles west of the village of Endako, upstream along the Endako River.
Claims: BONUS, totalling 21.
Access: By road, 2 miles west of Endako village.
Owner: MERCURY EXPLORATIONS LIMITED, 700, 1281 West Georgia Street, Vancouver 5.
Metal: Molybdenum.
Work done: Surface geological mapping, 1 inch equals 1 mile; induced polarization survey; surface diamond drilling.
Reference: Assessment Report 1979.

CHESS (No. 55, Fig. E)

Location: Lat. 54°07′ Long. 125°10′ (93K/3E)
Near Cheskwa Lake, 10 miles west of Endako village.
Claims: CHESS, totalling 48.
Access: By road, 6 to 10 miles west of Endako village.
Owner: MERCURY EXPLORATIONS LIMITED, 700, 1281 West Georgia Street, Vancouver 5.
Metal: Molybdenum.
Work done: Induced polarization survey; surface diamond drilling.
References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 152; Assessment Report 2002.

SAM (No. 32, Fig. E)

Location: Lat. 54°04′ Long. 125°17′ (93K/3W)
At approximately 3,000 feet elevation, about 10 miles due west of Endako, within the upper reaches of the Sam Ross Creek valley.
Claims: SAM 88 to 101.
Access: By four-wheel-drive vehicle from Highway 16, 2 miles.
Owner: ENDAKO MINES LTD., Endako.
Description: Overburden covers over 90 per cent of the area. Light-coloured Tertiary volcanic rocks crop out along the higher hills and ridges. These rocks appear to overlie Topley quartz diorites which are exposed at lower elevations.
Work done: Geochemical soil survey, 181 samples covering all claims.
References: Assessment Reports 2442, 2751.

PINKUT LAKE

JIM, GREEN (No. 35, Fig. E)

Location: Lat. 54°18–20′ Long. 125°35–39′ (93K/5E)
Astride Ling Creek, south of the south end of Pinkut Lake, 11 miles northeast of Burns Lake.
Claims: JIM, GREEN, totalling 72.
Access: By road from Burns Lake, 11 miles.
Owner: SUMMIT OILS LIMITED, 1110, 540 Fifth Avenue SW., Calgary 1, Alta.
Metals: Copper, molybdenum.
Description: Minor chalcopyrite and molybdenite disseminated in coarse-grained reddish-brown granite.

Work done: Magnetometer survey, 9.9 line-miles; electromagnetic survey, 9.9 line-miles; geochemical soil survey, 299 samples.

References: *Minister of Mines, B.C.*, Ann. Rept., 1963, p. 30; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 151; Assessment Report 2287.

STUART LAKE

KID (No. 21, Fig. E)

Location: Lat. 54°24′ Long. 124°52′ (93K/7W)
At approximately 3,500 feet elevation on the south slope of Shass Mountain, 23 miles north-northeast of Endako.

Claims: KID 1 to 105.

Access: By the Top Lake forestry access road from Fraser Lake, 38 miles.

Owner: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

Metal: Molybdenum.

Description: Molybdenite occurs in a quartz vein stockwork in a plug of quartz monzonite. Abundant pyrite is associated. Alteration is pervasive silicification, quartz veining, and minor kaolinization.

Work done: Surface geological mapping, 1 inch equals 400 feet and 1 inch equals 1,000 feet; geochemical soil survey, 587 samples covering 49 claims; road construction, 7 miles across and along the Sutherland River valley; trenching, 1,960 feet on Kid 1, 3 to 6, and 8 claims.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 136; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 120; Assessment Report 1866.

BAY (No. 47, Fig. E)

Location: Lat. 54°27′ Long. 124°30′ (93K/7E, 8W)
Kasaan Bay, on the southwest shore of Stuart Lake.

Claims: BAY 1 to 20.

Access: By road west from Fort St. James.

Operator: CONSOLIDATED SHUNSBY MINES LTD., 203, 350 Bay Street, Toronto, Ont.

Metals: Antimony, gold.

Work done: Geochemical survey.

Reference: Assessment Report 2764.

PINCHI LAKE

PINCHI LAKE MINE (No. 52, Fig. E)

By W. G. Clarke

Location: Lat. 54°37.5′ Long. 124°24.5′ (93K/9W)
On the north shore of Pinchi Lake.

Claims: One hundred and sixty-nine.

Access: By 29 miles of gravel road from Fort St. James.

Owner: COMINCO LTD., Box 220, Fort St. James (mine office, Pinchi Lake).

Metal: Mercury.

Work done: Underground: Drift advance, 973 feet; crosscut advance, 521 feet; raise advance, 309 feet; total development, 1,803 feet; diamond drilling, 16,640 feet. Underground mining is by a mechanized cut and fill method. There were 115 men employed.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 145–147; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 156.

MERC, CIN (No. 19, Fig. E)

LOCATION: Lat. 54°40′ Long. 124°20′ (93K/9W)
At approximately 2,250 feet elevation, 15 miles north-northwest of Fort St. James.

CLAIMS: MERC, CIN, 90 in all.

ACCESS: By gravel road from Fort St. James, 20 miles.

OWNER: HIGHLAND MERCURY MINES LIMITED, 700, 1177 West Hastings Street, Vancouver 1.

METAL: Mercury.

DESCRIPTION: Cinnabar occurs in siliceously recemented breccias of limestone, dolomite, and chert.

WORK DONE: Percussion drilling, 38 holes totalling 6,088 feet on CIN 74, 83, 87, and 94.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1965, p. 113; 1966, p. 118; 1968, p. 147; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 156; Assessment Report 686.

BUTTERFIELD LAKE

BL (No. 27, Fig. E)

LOCATION: Lat. 54°34′ Long. 125°32′ (93K/12E)
At approximately 4,000 feet elevation, in the Butterfield Lake area, 25 miles north of Burns Lake.

CLAIMS: BL 1 to 107.

ACCESS: By helicopter from Burns Lake, 25 miles.

OWNER: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

METAL: Copper.

DESCRIPTION: Chalcopyrite disseminations in chlorite-amphibole schist along intrusive contact.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 40 line-miles; electromagnetic survey, 40 line-miles; and geochemical soil survey, 1,080 samples covering BL 15 to 28 and 35 to 59.

REFERENCE: Assessment Report 2319.

TSITSUTL MOUNTAIN

DIANE (No. 48, Fig. E)

LOCATION: Lat. 54°55′ Long. 125°35′ (93K/13E)
At approximately 4,200 feet elevation, 4 miles southeast of Tsitsutl Mountain, on the west side of Tildesley Creek.

CLAIMS: DIANE 1 to 24.

ACCESS: By helicopter from Fort St. James, 60 miles.

OPERATOR: TERRA NOVA EXPLORATIONS LTD., 65 St. Anne Street, Quebec 4, P.Q.

METAL: Copper.

DESCRIPTION: Claim area underlain chiefly by andesitic greenstone, chlorite to amphibole schists, minor chert, and local serpentinized ultrabasics. Finely disseminated chalcopyrite is confined to the schists.

WORK DONE: Geochemical soil survey, 134 samples covering Diane 17 to 24; trenching, 10 feet by 15 feet on Diane 6.

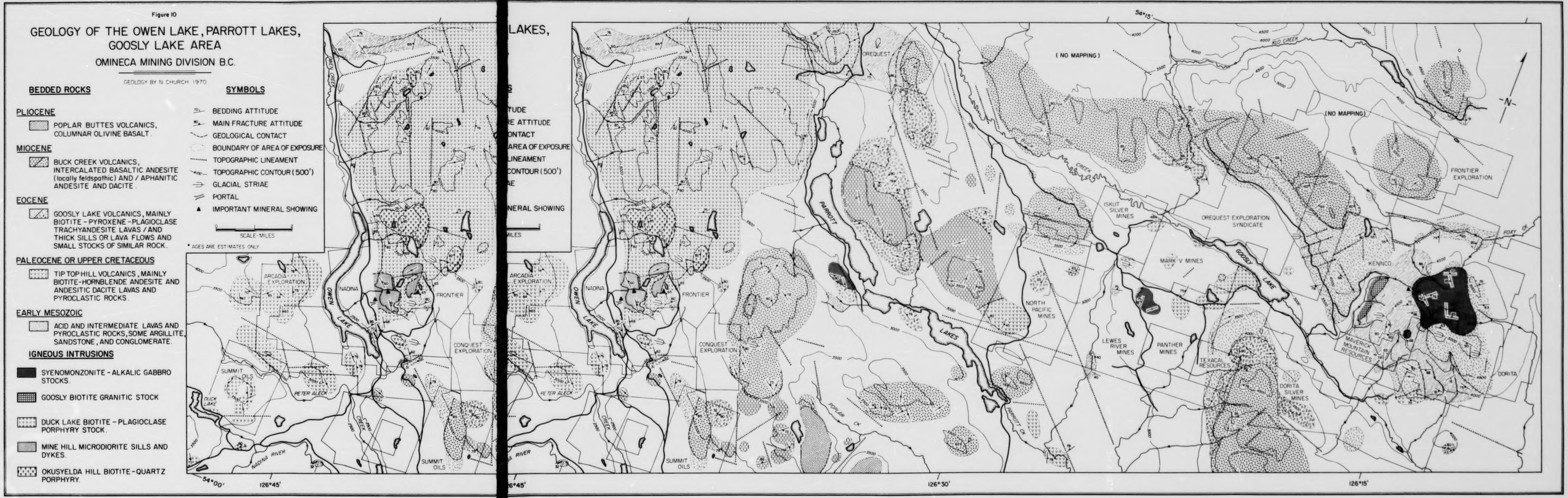
REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 109; Assessment Report 2414.

Figure 10

GEOLOGY OF THE OWEN LAKE, PARROTT LAKES, GOOSLY LAKE AREA

OMINECA MINING DIVISION B.C.

GEOLOGY BY N CHURCH 1970



OWEN CREEK
ARCADIA EXPLORATION
NADINA
OWEN LAKE
FRONTIER
CONQUEST EXPLORATION
SUMMIT OILS
DUCK LAKE
PETER ALECK
CREEK
NADINA RIVER
54°00'
126°45'
54°15'
OREQUEST
(NO MAPPING)
KLO CREEK
PARROTT
LAKES
BUCK CREEK
POPLAR CK
PARROTT CK
ISKUT SILVER MINES
OREQUEST EXPLORATION SYNDICATE
FRONTIER EXPLORATION
FOXY CK
MARK V MINES
GOOSLY LAKE
KENNCO
NORTH PACIFIC MINES
LEWES RIVER MINES
PANTHER MINES
TEXACAL RESOURCES
MAVERICK MOUNTAIN RESOURCES
DORITA
DORITA SILVER MINES
126°30'
126°15'
N
4000
3500
3000

BEDDED ROCKS

PLIOCENE

░ POPLAR BUTTES VOLCANICS, COLUMNAR OLIVINE BASALT.

MIOCENE

▨ BUCK CREEK VOLCANICS, INTERCALATED BASALTIC ANDESITE (locally feldspathic) AND / APHANITIC ANDESITE AND DACITE.

EOCENE

▨ GOOSLY LAKE VOLCANICS, MAINLY BIOTITE - PYROXENE - PLAGIOCLASE TRACHYANDESITE LAVAS / AND THICK SILLS OR LAVA FLOWS AND SMALL STOCKS OF SIMILAR ROCK.

PALEOCENE OR UPPER CRETACEOUS

▨ TIP TOP HILL VOLCANICS, MAINLY BIOTITE-HORNBLENDE ANDESITE AND ANDESITIC DACITE LAVAS AND PYROCLASTIC ROCKS.

EARLY MESOZOIC

▨ ACID AND INTERMEDIATE LAVAS AND PYROCLASTIC ROCKS, SOME ARGILLITE, SANDSTONE, AND CONGLOMERATE.

IGNEOUS INTRUSIONS

■ SYENOMONZONITE - ALKALIC GABBRO STOCKS.

▦ GOOSLY BIOTITE GRANITIC STOCK

▨ DUCK LAKE BIOTITE - PLAGIOCLASE PORPHYRY STOCK.

▨ MINE HILL MICRODIORITE SILLS AND DYKES.

▨ OKUSYELDA HILL BIOTITE-QUARTZ PORPHYRY.

SYMBOLS

- BEDDING ATTITUDE
- MAIN FRACTURE ATTITUDE
- GEOLOGICAL CONTACT
- BOUNDARY OF AREA OF EXPOSURE
- TOPOGRAPHIC LINEAMENT
- TOPOGRAPHIC CONTOUR (500')
- GLACIAL STRIAE
- PORTAL
- ▲ IMPORTANT MINERAL SHOWING

0 1 2
SCALE-MILES

* AGES ARE ESTIMATES ONLY

GEOLOGY OF THE OWEN LAKE, PARROTT LAKES, AND GOOSLY LAKE AREA

By B. N. Church

Introduction

The geology of a 300-square-mile strip between Owen Lake and Goosly Lake south of Houston is shown on Figure 10. This is a preliminary part of a more extensive study focused mainly on the petrology and stratigraphy of the Tertiary and Upper Mesozoic volcanic pile of Skeena Arch and mineralization resulting from the emplacement of feeder intrusions.

Physiography and Glacial History

The map-area is a well-dissected part of the Nechako Plateau on the Skeena-Fraser drainage divide. Elevations vary from somewhat below 2,400 feet on Owen Creek in the northwest part of the map-area to slightly above 5,300 feet near the east boundary.

The topography and drainage pattern are greatly modified as a result of Pleistocene glaciation. In general, the high ridges and summits have been bevelled and smoothed and the valley widened by the advance regional ice sheets and smaller valley glaciers.

The last advance of the Wisconsin (Fraser) Cordilleran ice sheet, determined from glacial striæ measurements, was easterly at about 085 degrees. Granite boulder erratics found scattered across the west part of the map-area were probably plucked and ice-rafted from the high mountain ranges to the west. Final retreat of the ice left the area strewn with gravel and clay, and drainage resulting from the ablation is responsible for the large areas of fluvial sands and esker deposits such as found in the vicinity of lower Parrott Lake.

Physiographic evidence shows that both Owen Lake and Goosly Lake were once much larger. According to interpretation, ancestral Owen Lake was ponded between a retreating valley glacier on the north and a thick terminal moraine on the south. Meltwaters entering this lake from the east, mainly from Wrinch Creek, built an outwash fan which now forms a distinctive broad bench, causing a conspicuous large bend in the present outline of Owen Lake. Breaching and downcutting of the terminal moraine at the south end of the lake resulted in drainage of the meltwaters and marked erosion along the valley between Owen Lake and Francois Lake.

The eventual withdrawal of ice from Owen Valley at the end of the glacial period caused a reversal in local water flow from the Fraser River system via Francois Lake on the south to the Bulkley River and Skeena River system to the north. In recent times, alluvial fans spread across the valley floor at the mouth of Emil Creek and Okusyelda Creek, near the north end of Owen Lake. Growth of these fans dammed Owen Creek from time to time and raised Owen Lake to its present level.

Ancestral Goosly Lake is believed to have extended about 4 miles west and 2 miles east beyond the shores of the present lake, covering a broad flat section of the main valley. Meltwater streams entered this body of water from the east more or less parallel to the present drainage and from the north along Klo Creek. The lake drained south from an outlet located about 1½ miles southwest of the present mouth of Klo Creek, the waters eroding a deep channel in older glacial outwash en route to Parrott Creek. Later the melting of an ice dam at the west end of the lake allowed the water to escape along the present course of Buck Creek, the south outlet being abandoned. Goosly Lake assumed its present size and level after erosion of a canyon through a section of basaltic lava flows on Buck Creek, near the margin of the former lake.

General Geology

The map-area is underlain by a diverse suite of Mesozoic and Tertiary volcanic rocks and a number of small intrusions (*see* Fig. 10).

The main stratigraphic divisions comprise a lower sequence of metamorphosed strata, believed to be Early Mesozoic age, and an upper sequence of cover rocks of Tertiary and possible Late Mesozoic age. Rocks of the lower sequence are poorly exposed and little is known about the distribution or thickness of these units. In contrast, the upper sequence has been mapped in detail and is readily divisible into subunits.

The igneous intrusions consist of acid, intermediate, and basic alkaline types. Most of these bodies are clearly younger than the lower series strata and some appear to be volcanic necks and feeders to the Tertiary volcanic rocks.

Bedded Rocks

Early Mesozoic sequence—The oldest stratigraphic units are exposed in a number of small windows eroded in the thick Tertiary cover rocks. The largest area of exposure is in the central and southeast part of the Kennco claim block in the east part of the map-area. Here the succession consists of locally steeply dipping dacitic tuff, tuff breccias, and cherty conglomerates. Other exposures near the northwest corner of the map-area consist of massive rhyolite lava and maroon dacitic tuff breccia. Also, smaller areas of rhyolite and intermediate volcanic rocks are found midway between lower Parrott Lake and Goosly Lake.

Late Mesozoic-Tertiary sequence—The Late Mesozoic and Tertiary rocks comprise four volcanic units showing a maximum aggregate thickness of about 4,300 feet. The informal names tentatively assigned to these units are the Tip Top Hill, Goosly Lake, Buck Creek, and Poplar Buttes volcanic rocks, respectively in order from stratigraphic lowest to highest.

The *Tip Top Hill volcanic rocks,* thought to be Upper Cretaceous or Paleocene age, cover almost the entire northwest corner of the map-area, extending in a line from the south end of Owen Lake to the north end of upper Parrott Lake and west beyond Owen Valley. The same rocks also crop out along Parrott Creek near the south boundary of the map-area and around Goosly Lake. The best-developed section, about 1,500 feet thick, is found on the divide north of Tip Top Hill.

The rocks are mainly brown volcanic breccias characteristically charged with small feldspar plates one-half to 2 millimetres long. Generally, the rocks also contain scattered hornblende phenocrysts, some of which are as much as 1 centimetre long. In thin-section the rocks are found to be merocrystalline with subhedral zoned plagioclase (about 35 per cent) and accessory biotite, pyroxene, and hornblende (about 7 per cent combined ferromagnesian minerals) suspended in a fine-grained devitrified matrix.

The mean composition of these rocks is between andesite and dacite, as indicated by arc-fusion determinations (*see* Fig. 11) and chemical analysis (*see* analysis 8, Table of Chemical Analyses).

The *Goosly Lake volcanic rocks,* considered to be Eocene age, are widely distributed throughout the central and east part of the map-area. The formation consists mainly of trachyandesite lava, with minor amounts of basalt and trachyte (*see* Fig. 10).

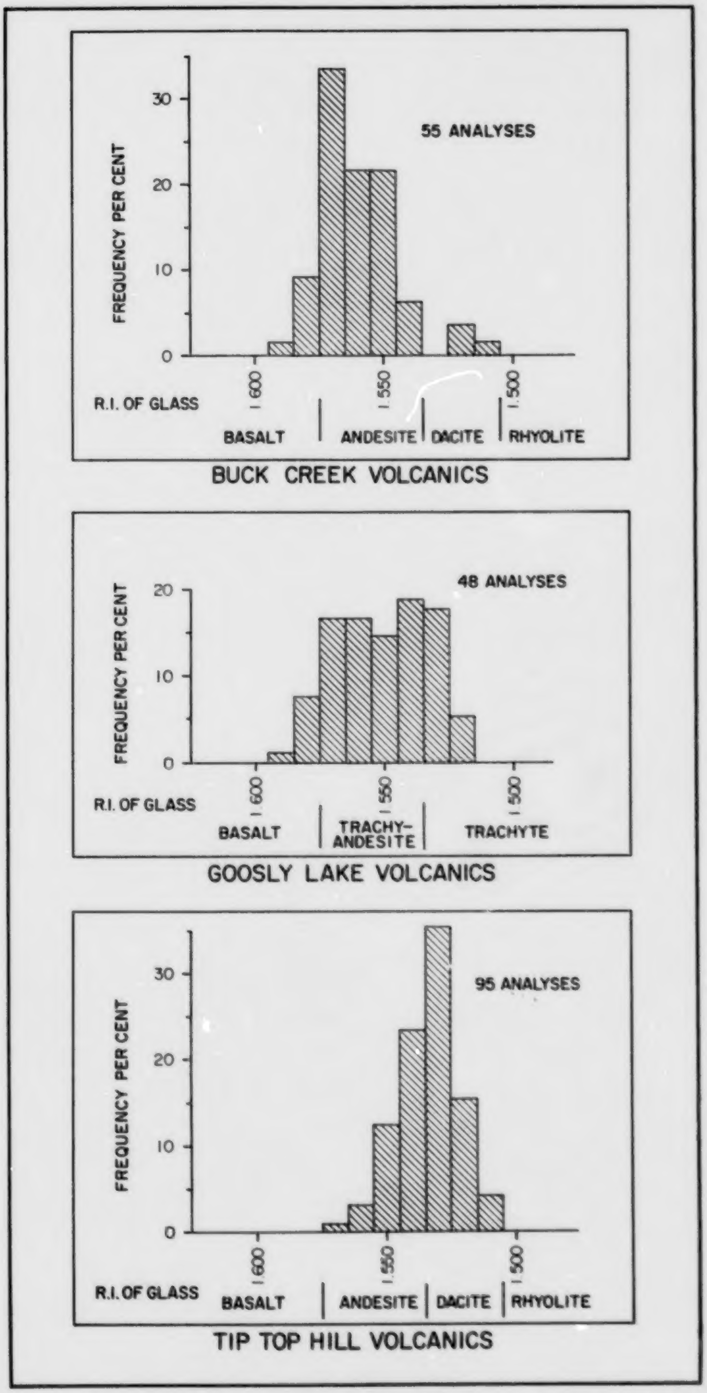


Figure 11. Composition frequency distribution of the Tertiary volcanic rocks in the Owen Lake, Parrott Lakes, Goosly Lake area.

The best-developed section, measuring about 1,500 feet thick, is located south of the southeast end of Goosly Lake. Other thick sections are found northeast of Goosly Lake and north of the Parrott Lakes.

In some of these areas, parts of the sections are unusually massive, resembling very thick lava flows, sills, and possibly discordant intrusions. Generally, the rocks are light brown or cream coloured and display lath-shaped phenocrysts or glomerophenocrystic clots of feldspar measuring 2 to 7 millimetres in diameter. Thin-sections show an average of 15 per cent plagioclase phenocrysts and accessory diopsidic augite, magnetite, biotite, and, less commonly, hornblende. These crystals are normally suspended in a fine-grained feldspathic matrix. Except for a few amygdales, quartz is not readily visible in thin-section, although analysis of a typical trachyandesite lava shows 7.4 per cent normative quartz (*see* analysis 6).

Compositional extremes consist of pyroxene porphyry basalt and aphanitic trachyte lavas (*see* analyses 5 and 7). The basalt is exposed locally on hillsides about 2 miles south and 4 miles southeast of Goosly Lake. The trachyte covers a small area on the west part of the Kennco property located roughly 2 miles northeast of Goosly Lake.

The *Buck Creek volcanic rocks,* probably Miocene age, are among the freshest rocks in the area. Typically, the beds are gently dipping, capping many of the ridges and hills in the south central and northeast parts of the map-area. The rocks are also found at low elevations adjacent to major easterly and southeasterly trending gravity faults near Buck Creek, west of Goosly Lake, and at the east end of the Parrott Lakes. The best-developed section, about 1,000 feet thick, is exposed along Klo Creek.

The formation is mainly basaltic andesite lava with local basalt and dacite intercalations (*see* Fig. 11). The rocks are predominantly aphanitic and medium brown or grey coloured. Thin-sections show on the average 80 per cent plagioclase microlites, 10 per cent interstitial pyroxene grains, 5 per cent disseminated fine-grained magnetite, and about 5 per cent interstitial biotite and brown chlorite. Some brown alteration material appears to be pseudomorphic after olivine; however, analysis of a typical sample of basaltic andesite shows 4.7 per cent normative quartz (*see* analysis 10).

Lavas, mineralogically similar to the aphanitic basaltic andesites but slightly coarser grained and containing scattered plagioclase phenocrysts, are found on the ridges northeast of the Parrott Lakes and between the Parrott Lakes and Owen Lake.

The *Poplar Buttes volcanic rocks,* estimated as Pliocene age, are the youngest rocks of the Tertiary sequence. The formation consists of a 200 to 300-foot-thick deposit of columnar olivine basalt forming local buttes. The only exposures of this unit occur near the south boundary of the map-area immediately southwest of Poplar Creek.

Typically, the rock is dark coloured and fine grained. Microscopic examination shows about 3 per cent subhedral olivine phenocrysts, one-quarter to 2 millimetres in diameter, set in a very fine-grained matrix composed of about equal parts plagioclase microlites and granular ferromagnesian minerals.

Norm calculations based on a chemical analysis of the rock shows 14.2 per cent nepheline; however, no feldspathoids and only a few small zeolite-filling gas cavities were discovered in thin-sections (*see* analysis 11).

Igneous Intrusions

The igneous intrusions are divided into an assemblage of granitic and gabbro-syenomonzonite stocks and a hypabyssal suite of which a sill-like diorite body is the most important representative.

The granitic-type intrusions are exposed in three main areas—in vicinity of Okusyelda Hill east of the north end of Owen Lake, at Duck Lake in the southwest corner of the map-area, and about 2 miles east of Goosly Lake on the Kennco property. Many of these rocks are porphyritic or microporphyritic, with between 20 and 50 per cent plagioclase phenocrysts and minor quartz, biotite, and hornblende in a finely granular quartzofeldspathic matrix.

The Okusyelda Hill intrusions are correlated with nearby acid pyroclastic rocks underlying the Tip Top Hill volcanics in the Owen Lake area; the Duck Lake and the Goosly granitic stocks are not known to be related to any volcanic rocks. The relative ages of these intrusions are uncertain; however, a potassium-argon age of 56.2±3 million years obtained on the Goosly body is somewhat younger than the anticipated age of the Okusyelda intrusions and associated volcanics.

The so-called Mine Hill microdiorite is a fine to medium-grained sill-like body exposed in the workings of the Silver Queen mine of Nadina Explorations Limited located east of Owen Lake. Typically the rock is charged with small plagioclase crystals 1 to 3 millimetres long and contains interstitial pyroxene, biotite, and minor quartz in some samples. The intrusion is believed to be a feeder to the Tip Top Hill volcanics which are petrographically and chemically similar (*see* analyses 8 and 9).

The gabbro-syenomonzonite intrusions consist essentially of three stocks aligned northeasterly striking about 070 degrees. These bodies are separated at roughly 8-mile intervals occurring in the central part of the Kennco property in the east part of the map-area, on the Lewes River property about 2½ miles southwest of Goosly Lake, and immediately west of the south end of upper Parrott Lake. In addition, a number of related dykes cut the Mine Hill microdiorite body on the same alignment about 5½ miles southwest of the Parrott intrusion.

Petrographically, the rocks consist of 65 to 80 per cent plagioclase (commonly as large-bladed phenocrysts), 5 to 20 per cent augite (small, rounded grains or long, prismatic phenocrysts), and accessory biotite, magnetite, and apatite. In addition, the syenomonzonite phases contain interstitial potassium feldspar and some quartz. Typically, the gabbroic phases are enriched in pyroxene and contain calcite and chlorite pseudomorphic after olivine and accessory feldspathoidal minerals in some samples.

These alkalic intrusions are thought to be the source of important Tertiary volcanism, the line of eruption being roughly coincident with the areas of thick trachyandesite lavas. Evidence of magmatic consanguinity of the plutonic and volcanic assemblages is supplied mineralogically and from chemical compositions (*see* analyses 1 to 7, incl.). The age of eruption is known from a potassium-argon determination of the Goosly syenomonzonite, 48.8±3 million years.

Mineralization

The line of syenomonzonite-gabbro intrusions extends in projection from Nadina Explorations Limited's Silver Queen mine at Owen Lake 21 miles northeast to Kennco Explorations, (Western) Limited's copper-silver discovery near Goosly Lake. Both deposits are thought to be derived from the alkaline intrusions, although the type of mineralization differs markedly. The Kennco discovery is a replacement sulphide deposit consisting of lenses of pyrite-chalcopyrite-pyrrhotite and disseminations of pyrite-chalcopyrite-tetrahedrite located adjacent to the Goosly syenomonzonite stock. In contrast, the showings of the Silver Queen mine are fissure-filled

Table of Chemical Analyses

Oxides Recalculated to 100

	1	2	3	4	5	6	7	8	9	10	11
SiO_2	49.12	51.64	53.90	54.65	51.68	57.83	61.95	59.88	59.78	55.08	44.00
TiO_2	1.51	2.89	1.51	1.88	0.91	1.30	1.75	0.83	0.76	1.56	3.01
Al_2O_3	16.66	16.00	17.25	17.57	16.19	18.15	17.16	18.20	18.31	18.58	15.11
Fe_2O_3	2.49	6.28	5.31	4.11	1.78	5.12	2.37	3.87	3.20	5.62	5.11
FeO	6.12	4.63	2.42	3.75	7.60	1.46	2.82	2.20	2.93	1.94	7.90
MnO	0.20	0.15	0.11	0.14	0.17	0.08	0.14	0.10	0.19	0.14	0.18
MgO	6.85	4.42	3.85	3.98	8.88	3.27	0.92	1.90	1.44	3.92	8.62
CaO	13.55	6.55	7.77	6.25	7.94	6.40	4.86	6.33	6.30	7.04	9.86
Na_2O	3.00	5.42	5.08	4.25	4.33	4.27	3.74	4.73	3.73	3.74	4.48
K_2O	0.50	2.02	2.80	3.42	0.52	2.12	4.29	1.96	3.36	2.38	1.73
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Oxides as Determined

	1	2	3	4	5	6	7	8	9	10	11
H_2O+	2.65	2.80	1.10	1.90	3.46	1.17	2.54	3.47	2.28	4.93	3.63
H_2O-	0.90	0.58	0.89	0.18	0.76	1.44	0.79	0.52	0.11	1.34	0.44
CO_2	0.69	0.10	1.15	0.02	1.93	0.02	5.50	0.01	0.11	0.02	0.01
P_2O_5	0.28	0.27	0.59	0.91	0.14	0.44	0.45	0.27	0.22	0.70	0.58
SO_3	0.09	0.15	1.55	1.01	0.01	0.02	0.02	—	0.07	—	—
BaO	0.07	0.04	0.28	—	0.01	—	0.24	0.14	0.18	0.27	0.12
SrO	0.05	0.04	0.12	—	0.10	—	0.06	0.024	—	0.09	0.09
Refractive index	—	—	—	—	1.584	1.562	1.538	1.538	1.542	1.564	1.604

Molecular Norms

	1	2	3	4	5	6	7	8	9	10	11
Quartz	—	—	—	0.1	—	7.4	12.4	9.6	9.9	4.7	—
Orthoclase	3.0	12.1	16.4	20.8	3.1	12.6	25.6	11.6	19.9	14.1	10.1
Albite	26.9	46.7	42.9	37.5	38.1	38.3	33.9	42.5	33.7	33.6	16.2
Nepheline	—	1.0	1.4	—	—	—	—	—	—	—	14.2
Anorthite	30.5	13.3	15.9	18.5	22.8	24.0	17.6	22.7	23.5	27.0	15.9
Wollastonite	14.7	7.7	9.0	4.9	6.4	3.1	2.7	3.5	3.2	3.2	13.1
Enstatite	5.8	—	—	11.0	5.1	9.0	2.6	5.2	4.0	10.9	—
Ferrosilite	1.7	—	—	—	1.9	—	0.3	—	1.3	—	—
Forsterite	9.8	9.2	7.9	—	14.2	—	—	—	—	—	17.7
Fayalite	2.9	—	—	—	5.4	—	—	—	—	—	3.3
Ilmenite	2.1	2.8	Trace	2.6	1.2	1.8	2.4	0.7	1.1	—	4.2
Magnetite	2.6	6.6	5.5	4.6	1.8	0.7	2.5	4.0	3.4	4.5	5.3
Unassigned	—	0.6	1.0	—	—	3.1	—	0.2	—	2.0	—

1. Gabbro phase of intrusion, 3 miles southwest of Goosly Lake.*
2. Syenogabbroic phase of intrusion, 3 miles southwest of Goosly Lake.*
3. Syenomonzonite immediately west of the south end of upper Parrott Lake.*
4. Syenomonzonite, 4 miles east of Goosly Lake; analysis 2, p. 148, G.E.M., 1969.
5. Basaltic lava, Goosly Lake volcanics, 4 miles southeast of Goosly Lake.*
6. Trachyandesite lava, Goosly Lake volcanics, 1 mile northeast of the east end of Goosly Lake, analysis 3, p. 148, G.E.M., 1969.
7. Trachyte lava, Goosly Lake volcanics, 2 miles northeast of the east end of Goosly Lake, exposed in a road cut.*
8. Andesite lava, Tip Top Hill volcanics, 1½ miles north of the west end of Goosly Lake on Klo Creek.*
9. Mine Hill microdiorite, Wrinch Creek area; analysis 1, p. 138, G.E.M., 1969.
10. Basaltic andesite lava, Buck Creek volcanics, 3¼ miles northeast of the southeast end of Owen Lake.*
11. Columnar olivine basalt, Poplar Buttes volcanics, 4½ miles south of the north end of lower Parrott Lake.*

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* Analyses by S. W. Metcalfe and R. S. Young, British Columbia Department of Mines and Petroleum Resources.

veins of pyrite, sphalerite, and some galena, with local concentrations of chalcopyrite and minor tennantite. An intrusion like the Goosly syenomonzonite stock may be deeply buried in vicinity of the Silver Queen mine, with only the offshoot dykes being visible in the mine workings.

The two deposits appear to be complimentary, that is, together they may represent a complete spectrum of mineral assemblages that would otherwise be apparent in a single ideally exposed and completely preserved deposit. Details on the habit and mode of emplacement of the deposits are no doubt partly controlled by the structure and reactive susceptibility of the host rocks.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 122–151.

GOOSLY LAKE

DEV (No. 138, Fig. C)

By B. N. Church

LOCATION: Lat. 54°09′ Long. 126°09′ (93L/1E)
Twenty-eight miles southeast of Houston and 7 miles east of Goosly Lake.

CLAIMS: DEV 1 to 85.

ACCESS: Seven miles by helicopter from the east end of Goosly Lake.

OWNER: DELBROOK MINES LIMITED, 4470 Glencanyon Drive, North Vancouver.

DESCRIPTION: The property was located to cover a magnetic high area on Allin Creek, shown on Geological Survey of Canada aeromagnetic map No. 5302G. Although the region appears to be largely covered with glacial debris, a company geological map shows small areas of Tertiary volcanic rocks exposed on Allin Creek in the central part of the claim block and on a hillside to the east. A geochemical survey shows anomalous copper and silver concentrations in soils on the north central and northwest claims.

WORK DONE: Magnetometer work includes 8.8 line-miles of survey. A total of 223 soil samples was collected for geochemical analysis.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 149; Assessment Report 2291.

EGG, JH (No. 137, Fig. C)

By B. N. Church

LOCATION: Lat. 54°11′ Long. 126°11′ (93L/1E)
Twenty-five miles southeast of Houston and 6 miles east of Goosly Lake.

CLAIMS: A total of 66 claims, including EGG 1 to 23, JH 1 to 28, 41 to 48, 62 to 65, and others.

ACCESS: Twenty-seven miles by gravel road from Houston to the west end of Goosly Lake, thence 6 miles northeast by helicopter.

OWNER: DORITA SILVER MINES LTD., 808, 602 West Hastings Street, Vancouver 2.

DESCRIPTION: The claims are situated along the east side of the large Kennco Explorations, (Western) Limited claim block northeast of Goosly Lake (*see* Fig. 10). They occupy an area of extensive glacial drift on the east slope of the main hill and part of the low divide between Allin Creek and Foxy Creek. A number of modest copper and silver anomalies are reported from soil analysis in the southern part of the property.

WORK DONE: Line-cutting and a copper-silver soil geochemical survey.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 150; Assessment Report 2310.

SG (SAM GOOSLY) (No. 147, Fig. C)

By B. N. Church

Location: Lat. 54°11′ Long. 126°16′ (93L/1W)
Approximately 21 miles southeast of Houston.

Claims: A total of 321 full claims and fractions, including 62 SG, 15 SNOW, 44 T, 199 TL claims.

Access: Thirty-five miles from Houston via the Buck Creek road.

Owner: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

Metals: Copper, silver.

Description:

A preliminary report on the geology of the Sam Goosly property was published in *Geology, Exploration, and Mining in British Columbia* for 1969, pages 126 to 139. The purpose of this report is to amplify the previous description in the light of recent regional mapping and provide more information on mineralization.

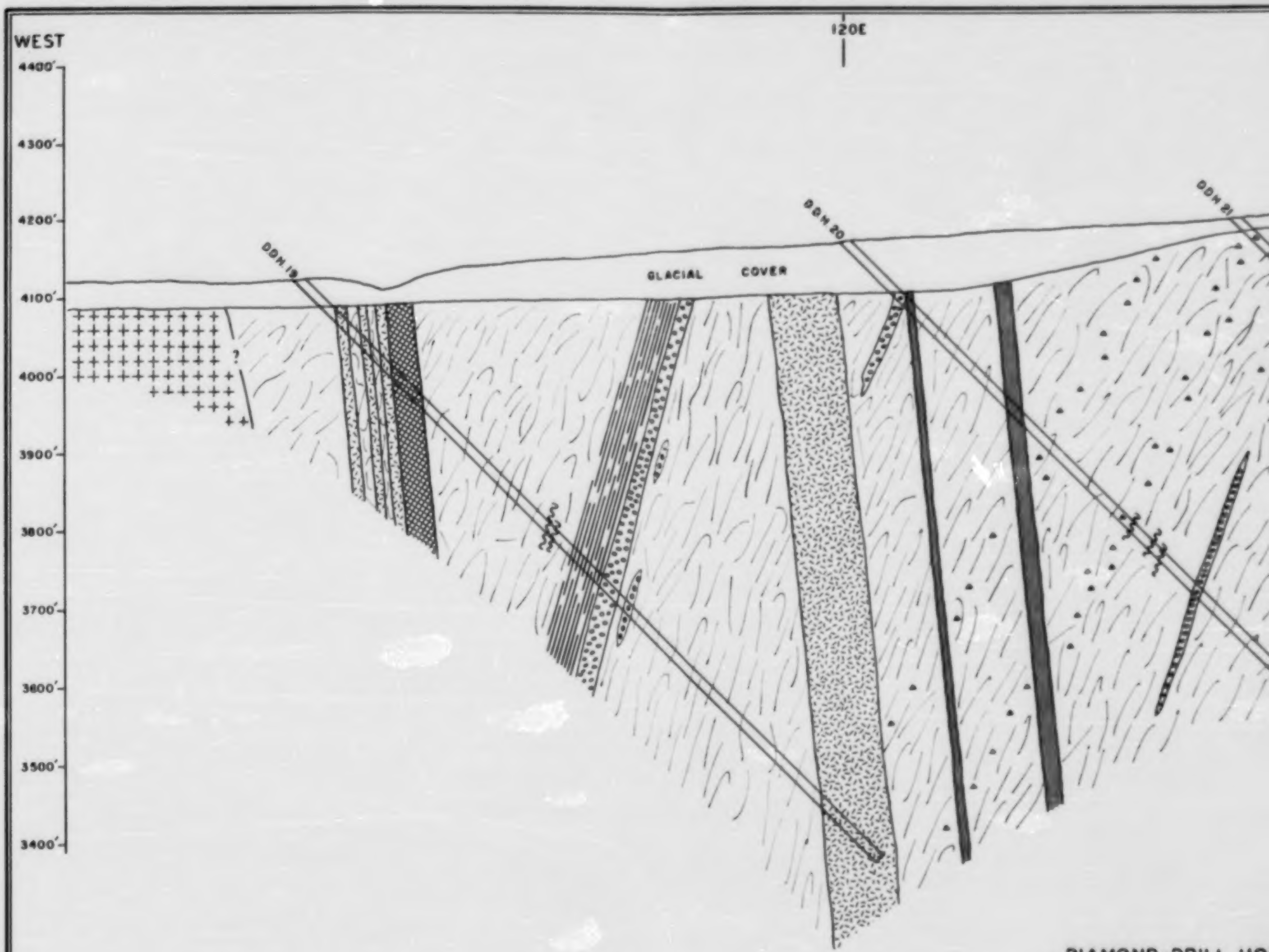
It is now known that the area of Early Mesozoic volcanic and sedimentary rocks extends from the mineralized zone, located west of the syenomonzonite stock, a distance of about 3 miles to the southeast part of the property (*see* Fig. 10). These rocks form a thick section of pebble and boulder conglomerates with intercalated sandstone, local deposits of maroon dacitic tuff breccia, and minor andesitic lava flows and pyroclastic beds. This succession is capped by Eocene feldspar porphyry lavas on the ridge immediately southeast of the syenomonzonite stock.

Diamond drilling has continued in zones north and south of the discovery area. Bulldozer work on a new drill access road uncovered tourmalinized, pyritic dacite breccia about 1,500 feet northeast of the Kennco camp-site in an area of no previously known Mesozoic exposures.

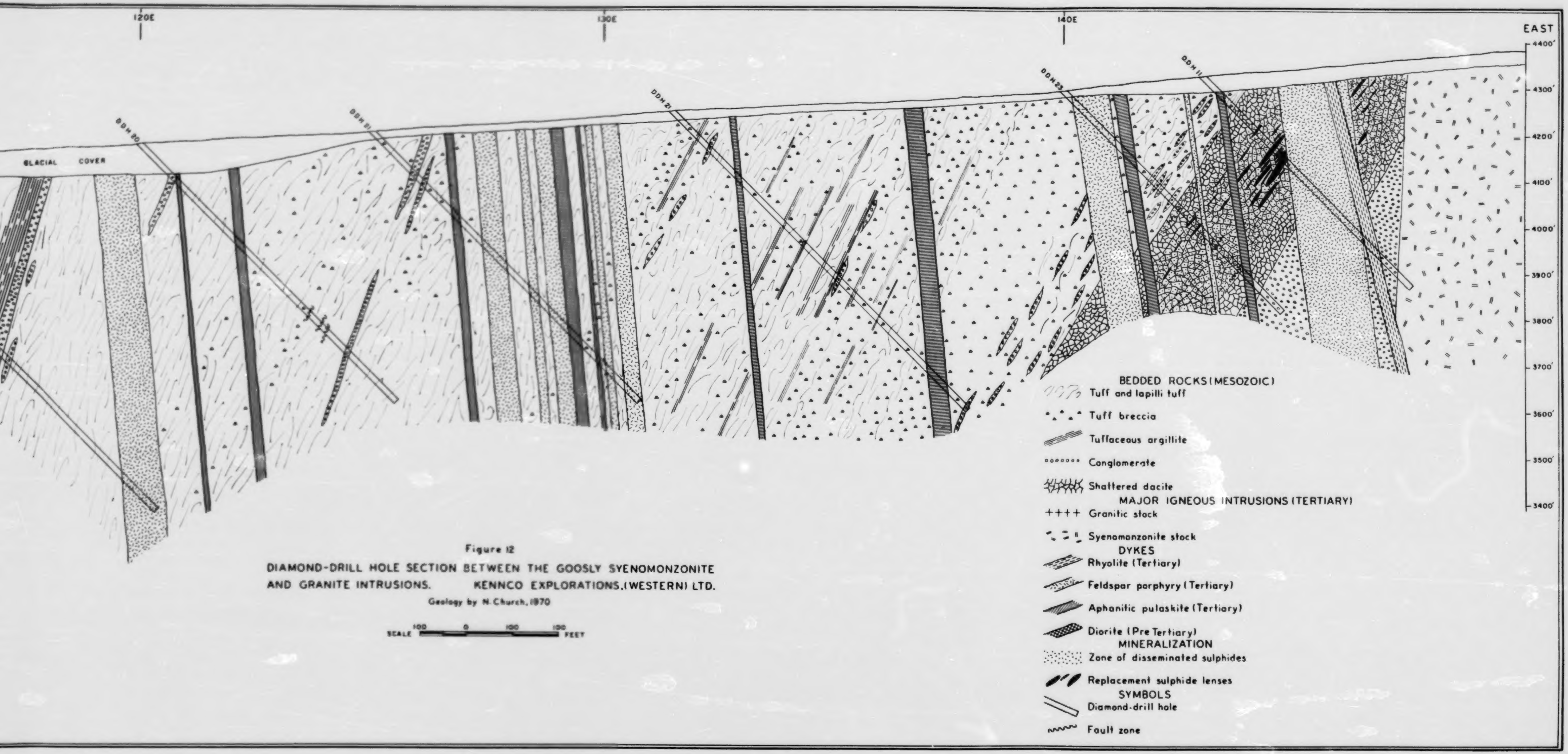
An east-west section of the area between the Goosly syenomonzonite stock and the granitic intrusion was reconstructed from data gathered from cores of six diamond-drill holes (*see* Fig. 12). The section shows a thickness of approximately 2,500 feet of steep, westerly dipping volcanic and sedimentary beds which is intruded by a swarm of nearly vertical Tertiary dykes with an apparent total thickness of about 500 feet.

The upper and most westerly Mesozoic beds are soft-grey tuff and lapilli tuffs with a few zones of chert pebble conglomerate and laminar bedded tuffaceous argillite. The centre part of section shows a progressive increase stratigraphically downward in the volume of tuff breccia and coarse volcanic debris. The fragments are mainly aphanitic dacite, with some microporphyritic feldspathic admixtures near the middle of the succession. Local deposits of porcelaneous rhyolite breccia and thin welded rhyolite ash flow units are also present. In the lower part of the succession, dacitic tuff breccia with some intercalated chert pebble conglomerate is found overlying a tongue-like body of shattered dacite (possibly an autobrecciated lava dome). The base of the stratigraphic section is composed of several hundred feet of markedly indurated light-coloured chert pebble conglomerate.

The main mineralized zone, about 175 feet thick, is composed of finely disseminated sulphides and coarse-grained sulphide replacement bodies located in the central part of the dacite tongue. The disseminated sulphide phase forms the bulk of the mineralized zone; the composition is somewhat variable, averaging 0.7 per cent chalcopyrite and 3.8 per cent pyrite and grey sulphides (based on 25 modal


WEST
120E
4400′
4300′
4200′
4100′
4000′
3900′
3800′
3700′
3600′
3500′
3400′
DDH 19
DDH 20
DDH 21
GLACIAL COVER
?

DIAMOND-DRILL HO
AND GRANITE INTR


120E
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3500'
3400'
GLACIAL COVER
DDH 20
DDH 21
DDH 21
DDH 23
DDH 11
BEDDED ROCKS (MESOZOIC)
Tuff and lapilli tuff
Tuff breccia
Tuffaceous argillite
Conglomerate
Shattered dacite
MAJOR IGNEOUS INTRUSIONS (TERTIARY)
++++ Granitic stock
Syenomonzonite stock
DYKES
Rhyolite (Tertiary)
Feldspar porphyry (Tertiary)
Aphanitic pulaskite (Tertiary)
Diorite (Pre Tertiary)
MINERALIZATION
Zone of disseminated sulphides
Replacement sulphide lenses
SYMBOLS
Diamond-drill hole
Fault zone
SCALE 100 0 100 100 FEET

Figure 12

DIAMOND-DRILL HOLE SECTION BETWEEN THE GOOSLY SYENOMONZONITE AND GRANITE INTRUSIONS. KENNCO EXPLORATIONS, (WESTERN) LTD.

Geology by N. Church, 1970

estimates). The coarse sulphide replacements are irregularly distributed in the zone of intense sulphide dissemination. These structures are lens-like bodies as much as 10 feet thick, with an average modal composition of 31 per cent chalcopyrite, 23 per cent pyrite, and 17 per cent pyrrhotite (based on 14 analyses). It is noted that in these massive replacements preservation of the mosaic breccia texture typical of the shattered dacite is locally almost perfect.

The thick chert pebble conglomerate unit at the base of the section shows local abundance of finely disseminated pyrite and tetrahedrite(?) interstitial to the fragments.

Elsewhere pyrite is scattered sparingly throughout the section in joint and cleavage fillings and less commonly as disseminations in the host rocks. Specularite and sphalerite accompany the pyrite locally.

The alteration attendant to the sulphide-enriched areas has not been studied in detail; however, the country rocks are known to be at least partially sericitized and have apparently undergone some alteration to clay minerals. In areas of intense sulphide emplacement near the syenomonzonite contact the dacite is transformed by recrystallization and metasomatism, forming a finely felted mottled dark-coloured rock.

Fluorite, tourmaline, and scorzalite are the most conspicuous accessory minerals introduced into the sulphide zone and adjacent host rocks. All three minerals are believed to be of hydrothermal origin and occur in local abundance in fractures. Tourmaline is also found as bursts of small prismatic crystals in volcanic breccia and as hard, black seams parallel to bedding-planes. Scorzalite, although generally thought to be a rare mineral, is found in much of the drill core and surface trenches. This bright blue mineral, a hydrous aluminum iron phosphate, has been identified by X-ray and spectrographic analysis (*see* accompanying table).

It is believed that the mineralizing solution rich in fluorine, boron, and phosphorus emanated from the syenomonzonite stock at considerable depth. These solutions passed upward through the fracture systems, being locally deflected along the steeply inclined bedding-planes to favourable sites for deposition and replacement. This theory is tentatively supported by the unusual occurrence of the mineral scorzalite and the high phosphate content of the syenomonzonite, 0.91 per cent (*see* analysis No. 2, G.E.M., 1969, p. 148), and comparable ages of the intrusion and sericite development in the mineralized zone.

WORK DONE: Detailed geological mapping of the entire property on the scale of 1 inch equals 200 feet; geophysical work, including a magnetometer survey covering 118.6 line-miles and an induced polarization survey totalling 24.95 line-miles; geochemical analysis of 4,846 soil samples; road construction totalling 7½ miles in the central and eastern part of the claim group; diamond drilling, 28 holes totalling 22,277 feet.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 142–148; Assessment Report 1683.

X-ray Analyses

I	dA	I	dA	I	dA
2	10.1	----	----	----	----
1	7.09	----	----	----	----
3	6.15	6	6.17	1	6.12
3	5.58	----	----	----	----
----	----	----	----	3	5.21
1	5.01	----	----	----	----
4	4.74	6	4.72	5	4.72
4	4.545	----	----	4	4.360
3	3.920	----	----	1	3.975
1	3.635	----	----	1	3.635
----	----	4	3.60	----	----
4	3.495	----	----	----	----
1	3.340	----	----	----	----
10	3.240	10	3.24	----	----
----	----	10	3.20	10	3.220
5	3.136	8	3.14	8	3.126
3	3.058	6	3.08	6	3.061
1	2.990	----	----	1	2.960
3	2.832	----	----	----	----
7	2.563	6	2.55	7	2.542
1	2.490	----	----	----	----
----	----	----	----	1	2.454
2	2.372	----	----	----	----
----	----	2	2.34	2	2.336
3	2.267	6	2.26	5	2.254
2	2.222	5	2.22	5	2.214
2	2.174	----	----	----	----
----	----	----	----	1	2.137
3	2.091	----	----	----	----
----	----	2	2.05	1	2.040

1. Scorzalite from the Goosly area, Kennco Explorations, (Western) Limited; analysis by N. Colvin, British Columbia Department of Mines and Petroleum Resources.

2. Scorzalite, ASTM cards (reference Berry, 1948).

3. Lazulite, sample from Graves Mountain, Georgia, provided by K. E. Northcote; analysis by N. Colvin, British Columbia Department of Mines and Petroleum Resources.

Spectrographic analysis on No. 1:

Si—more than 10 per cent.
Al—more than 10 per cent.
P—present in abundance.
Fe—12 per cent.
Mg—2.5 per cent.
Ca—less than 1 per cent.

BJ, DM, HELEN (No. 135, Fig. C)

LOCATION: Lat. 54°15′ Long. 126°14′ (93L/1E, 1W, 8E)
At approximately 4,400 feet elevation, on Foxy Creek, 7 miles northeast of Goosly Lake.

CLAIMS: BJ 1 to 50, DM 1 to 33, HELEN 1 to 20.

ACCESS: By road from Houston, 20 miles.

OWNER: DERBY MINES LTD., 720 West Hastings Street, Vancouver 1.

METALS: Copper, silver.

WORK DONE: Four miles of new and 16 miles of improved road constructed.

B (No. 135, Fig. C)

By B. N. Church

Location: Lat. 54°14.5′ Long. 126°15′ (93L/1E, 1W)
Eighteen miles southeast of Houston and 6 miles northeast of Goosly Lake.

Claims: B 1 to 30.

Access: Nineteen miles from Houston via the Dungate Creek dirt road.

Owner: FRONTIER EXPLORATION LIMITED, 642 Clark Drive, Vancouver 6.

Description: The property is located 3½ miles due north of Kennco Explorations, (Western) Limited's copper-silver discovery near Goosly Lake (*see* Fig. 10). The rocks underlying the west part of the property appear to be Middle Tertiary basaltic andesite lavas. The east claims occupy low ground and were not explored.

Work done: Line-cutting, approximately 30 line-miles.

Reference: Assessment Report 2206.

MBJ (No. 136, Fig. C)

By B. N. Church

Location: Lat. 54°07′ Long. 126°15′ (93L/1E, 1W)
Seven miles northwest of Colleymount on Francois Lake.

Claims: MBJ 1 to 12, 30, 32 to 48, 161 to 172, 189 to 200.

Access: By trail from Colleymount, 7 miles.

Owner: GRANITE MOUNTAIN MINES LTD., 330, 470 Granville Street, Vancouver 2.

Description: The area appears to be underlain mainly by Middle Tertiary basaltic andesite.

Work done: Surface diamond drilling, six holes totalling 525 feet on MBJ 171 and 168.

NWB (No. 142, Fig. C)

By B. N. Church

Location: Lat. 54°08.9′ Long. 126°15′ (93L/1W)
Eighteen miles southeast of Houston, near Goosly Lake.

Claims: Six groups, designated NWB, ACR, K, WD, LUV, and HOT, totalling 249 full claims and fractions.

Access: Twenty-five miles from Houston via the Buck Creek gravel road.

Owner: DORITA SILVER MINES LTD., 808, 602 West Hastings Street, Vancouver 2.

Description: The property is L-shaped, lying adjacent to the large Kennco Explorations, (Western) Limited claim block on the west and south. Good bedrock exposure is found on the slopes north and south of Goosly Lake in the west part of the property. The disposition of the various Tertiary and Late Mesozoic units underlying this area is shown on Figure 10. The current area of attention on this property is about 3½ miles southeast of Goosly Lake, where a geochemical survey indicated an anomalous copper-silver zone. Bulldozer stripping in the west part of this zone reveals Upper Mesozoic or Lower Tertiary andesite lava and breccia showing a few pyritiferous stringers and veinlets of quartz and calcite.

Work done: Line-cutting, induced polarization work, and an extensive geochemical soil survey have been completed to date. Some of the more promising geochemical anomalies were investigated further with D-7 bulldozer trenching preparatory to a drill programme.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 150; Assessment Report 2311.

FKE, NRG (No. 139, Fig. C)

By B. N. Church

Location: Lat. 54°10.5′ Long. 126° 24′ (93L/1W)
Eighteen miles southeast of Houston, immediately south of Goosly Lake.

Claims: Two groups— 16 FKE, 34 NRG.

Access: Twenty-five miles from Houston via the Buck Creek gravel road.

Owner: MARK V MINES LIMITED, 534, 789 West Pender Street, Vancouver 1.

Description: Except for a few small exposures, the property is covered with glacial drift. Andesite lavas and breccias similar to the Tip Top Hill volcanics in the Owen Lake area crop out on a small knob in the west central part of the property and in the north on the south shore of Goosly Lake and near Buck Creek. A geochemical soil survey shows generally low copper and zinc levels with a few widely scattered higher values. No significant geochemical pattern was found.

Work done: A total of 772 soil samples was collected along 15.4 miles of cut-lines and analysed for copper and zinc.

Reference: Assessment Report 2239.

JR, JT (No. 141, Fig. C)

By B. N. Church

Location: Lat. 54°12′ Long. 126°22′ (93L/1W)
Immediately north of Goosly Lake and 19 miles southeast of Houston.

Claims: Fifty-two JR, 54 JT, 58 AM, six CR, 12 FG.

Access: Thirty miles from Houston by the Buck Creek gravel road and 5 miles of mine access road north of Goosly Lake.

Owner: A. MacDonald.

Operator: OREQUEST EXPLORATION SYNDICATE, 711, 850 West Hastings Street, Vancouver 1.

Description: The property is underlain by a large area of glacial drift along the north shore of Goosly Lake (*see* Fig. 10). Farther north, slopes display a thick succession of Early and Middle Tertiary lavas. No mineralization was found.

Work done: Line-cutting; approximately 8 miles of road construction; a geochemical survey including analysis of 500 soil samples for silver, copper, lead, and zinc; bulldozer trenching; percussion drill programme.

Reference: Assessment Report 2335.

RAY (No. 130, Fig. C)

By B. N. Church

Location: Lat. 54°11′ Long. 126°26′ (93L/1W)
Eighteen miles southeast of Houston and 1 mile west of Goosly Lake.

Claims: RAY, totalling 40.

Access: On the Buck Creek road, 20 miles from Houston.

Owner: ISKUT SILVER MINES LTD., 534 Burrard Street, Vancouver 1.

Description: Most of the property has thick overburden, except for a small exposure of andesite (Late Mesozoic or Early Tertiary?) in the northeast part near Buck Creek, and exposures of aphanitic basaltic lava (Miocene?) near the southwest corner of the property on the main Buck Creek road (*see* Fig. 10). No mineralization was observed.

Work done: Line-cutting, north-trending lines 400 feet apart totalling 23 miles; geochemical survey, 320 samples analysed for silver, copper, lead, and zinc.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 148, 149; Assessment Report 2318.

DOE (No. 133, Fig. C)

By B. N. Church

LOCATION: Lat. 54°08.5′ Long. 126°29′ (93L/1W)

Nineteen miles southeast of Houston and 5½ miles southwest of Goosly Lake.

CLAIMS: DOE 1 to 100.

ACCESS: By gravel road from Houston, 16 miles via the Buck Creek road, plus 5 miles along the east Parrott road to the centre of the property.

OWNER: NORTH PACIFIC MINES LTD., 2502, 1177 West Hastings Street, Vancouver 1.

DESCRIPTION:

The property occupies mainly low ground with only scattered bedrock exposures (*see* Fig. 10).

Magnetic anomalies are found in two areas, the extreme north and the central parts of the claim block. The northerly anomaly is underlain by faulted feldspathic trachyandesites (Eocene) and aphanitic basaltic lava (Miocene?). The central anomaly coincides with what appears to be a small plug—a feeder to the trachyandesite volcanics. Andesite lavas cropping out in the southwest area are similar to the Tip Top Hill volcanics of the Owen Lake area; these are probably of Upper Mesozoic or lowest Tertiary age.

The property lies at the junction of major easterly and southeasterly trending topographic lineaments which probably reflect important underlying faults.

No mineralization was observed.

WORK DONE: Approximately 40 miles of line-cutting, a complete magnetometer survey, and preparation of a detailed topographic map.

REFERENCES: Assessment Reports 2565, 2566.

JAN, WL (No. 129, Fig. C)

By B. N. Church

LOCATION: Lat. 54°12′ Long. 126°38′ (93L/2E)

Thirteen miles south of Houston.

CLAIMS: A contiguous block of 106 claims, designated JAN and WL.

ACCESS: Fourteen miles from Houston via the Buck Creek and Parrott Lakes gravel roads.

OWNER: A. MacDonald.

OPERATOR: OREQUEST EXPLORATION SYNDICATE, 711, 850 West Hastings Street, Vancouver 1.

DESCRIPTION: The main claims of this group were located on a zone of rusty soils visible along the Parrott Lakes road near the divide, 2½ miles west of Buck Creek. Subsequent geological investigation revealed an extensive area east of the road underlain by Early Mesozoic maroon tuff breccias. Rhyolite lava, about the same age as the tuff breccia, crops out on the crest of a hill west of the road. Younger volcanics, including andesites, trachyandesites, and basaltic rocks, are found in the west and extreme east parts of the property (*see* Fig. 10). Several percussion holes were drilled across a zone, near the centre of the property, showing very high zinc concentrations in soil samples. In spite of this intensive investigation, the source of the geochemical anomaly has not yet been located.

WORK DONE: Line-cutting, a geochemical survey, and percussion drilling.

REFERENCE: Assessment Report 2427.

GARY (No. 127, Fig. C)

By B. N. Church

Location: Lat. 54°07′ Long. 126°38′ (93L/2E)
Twenty miles south of Houston and 1 mile west of north Parrott Lake.

Claims: GARY 1 to 16.

Access: Twenty-three miles from Houston via the Buck Creek gravel road, thence to the end of the Parrott Lakes road and west on trail by foot for about 1 mile.

Owner: SUMMIT OILS LIMITED, 1110, 540 Fifth Avenue SW., Calgary 1, Alta.

Description: The property is near south Parrott Lake in an area of glacial cover just south of exposures of Eocene(?) trachyandesite lava and a small syenomonzonite plug. The claims were staked to cover an intersection of two major magnetic trends shown on Geological Survey of Canada aeromagnetic map No. 5317G. Geochemical and geophysical work to date is inconclusive.

Work done: Geochemical work included analysis of 53 soil samples and five silt samples for copper and zinc; magnetometer survey, a profile 4,500 feet along the base-line.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 141; Assessment Report 2289.

OWEN LAKE

HDP (No. 128, Fig. C)

By B. N. Church

Location: Lat. 54°05′ Long. 126°33′ (93L/2E)
Twenty-three miles south of Houston and 2½ miles east of the south end of Owen Lake.

Claims: HDP, totalling 26 claims and fractions.

Access: By farm road and trail 2 miles east of the south end of Owen Lake.

Owner: CONQUEST EXPLORATION LTD., c/o Box 352, Smithers.

Description: A diamond-drill hole penetrating an area of glacial drift near the west side of the property intersected trachyte at a depth of 65 feet. These rocks are similar to Eocene lavas found in the Goosly Lake area. Fine-grained vesicular basaltic andesite lava flows (Miocene?) crop out on the steep slope on the east side of the property.

Work done: Line-cutting; 31 north-trending picket-lines spaced 200 feet apart totalling 29 line-miles, plus a southeast-trending base-line 1.7 miles long.

Reference: Assessment Report 2426.

SPOOK, PARK (No. 144, Fig. C)

By B. N. Church

Location: Lat. 54°02.6′ Long. 126°30′ (93L/2E)
Eighteen miles due south of Houston, 2½ miles southeast of Owen Lake.

Claims: Two groups—SPOOK, 94 claims; PARK, six claims.

Access: Twenty-eight miles by gravel road from Houston.

Owner: LOBELL MINES LIMITED, 4470 Glencanyon Drive, North Vancouver.

Description: The main bedrock exposure is in the northeast part of the Spook claim group. The rocks consist of an assemblage of feldspathic trachyandesite (Eocene?) and feldspathic basaltic andesite and aphanitic dacite lava (Miocene?). No mineralization was observed in these rocks. A geochemical soil survey shows anomalous high silver, copper, and zinc values coincident with a southeasterly trending topographic lineament located immediately south of the above-described exposure. This favourable geochemical area lies on strike with the Nadina vein system, located about 2½ miles to the northwest (*see* Fig. 10).

Work done: Geological mapping at the scale of 400 feet to 1 inch; geophysical exploration, including 24.2 line-miles of magnetometer, electromagnetic, and induced polarization surveys; geochemical analysis of 664 soil samples for silver, copper, and zinc.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 142, Assessment Report 2290.

MO, CD (No. 140, Fig. C)

By B. N. Church

Location: Lat. 54°03′ Long. 126°43.5′ (93L/2E)
The claims are located 24 miles due south of Houston and 1½ miles southeast of the south end of Owen Lake.

Claims: MO 1 to 20, CD 1 to 6.

Access: Thirty-two miles from Houston, via the Morice River and Owen Lake gravel roads.

Owner: A. MacDonald.

Operator: OREQUEST EXPLORATION SYNDICATE, 711, 850 West Hastings Street, Vancouver 1.

Description: The property is largely covered by glacial drift. The purpose of a geochemical and geophysical survey was to investigate an anomaly shown on Geological Survey of Canada aeromagnetic map No. 5301G (Owen Lake). A magnetometer survey apparently outlined a geological unit of high magnetic susceptibility underlying the east part of the property and another unit of relatively low susceptibility to the west. Geochemical results from soil-sampling show generally modest silver, copper, lead, and zinc, with slightly higher concentrations of these metals in the extreme northeast part of the property (*see* Fig. 10).

Work done: A total of 7 miles of line-cutting, soil sampling, and a magnetometer survey.

Reference: Assessment Report 2404.

NAD (No. 134, Fig. C)

By B. N. Church

Location: Lat. 54°03′ Long. 126°41′ (93L/2E)
Immediately south and southeast of Owen Lake.

Claims: Thirty-three NAD claims.

Access: Twenty-eight miles from Houston via the Owen Lake and the Morice River roads.

Owner: J. T. WILLIAMSON, 4674 Keith Road, West Vancouver.

Description:

The Nad claims cover an area south and southeast of Owen Lake adjacent to property currently under development by Nadina Explorations Limited (*see* Fig. 10).

The area is extensively covered with glacial debris; however, a few key exposures reveal the general nature of the underlying rocks. The entire southeast half of the property has scattered exposures of feldspathic basaltic andesite lava which is believed to be Miocene. Trachyandesite lavas and bedded tuffs of probable Eocene age are exposed immediately to the northwest along Riddeck Creek. Andesite lavas and pyroclastics crop out locally on the ridges in the extreme west part of the property.

Examination of geophysical data shows that the areas of high magnetic response are mainly coincident with the basaltic andesite lavas. Perhaps, significantly, a southeasterly trending lineament crosses the east central part of the claim block coincident with a magnetic trough. The lineament appears to be subparallel to the strike of the main Nadina vein system and passes through at least one area designated as an electromagnetic anomaly.

WORK DONE: Airborne magnetometer and electromagnetic surveys.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 122–126; Assessment Reports 1133, 2272.

SILVER QUEEN (NADINA) (No. 145, Fig. C)

By B. N. Church

LOCATION: Lat. 54°05′ Long. 126°43.8′ (93L/2W)

The mine workings are just east of Owen Lake, 21 miles due south of Houston.

CLAIMS: A total of 144 mineral claims and fractions including 17 Crown-granted claims.

ACCESS: Twenty-eight miles from Houston via the Morice River and Owen Lake gravel roads.

OWNERS: Seventeen Crown-granted claims owned by Canadian Exploration Limited and 127 claims held by location owned by Nadina Explorations Limited.

OPERATOR: NADINA EXPLORATIONS LIMITED, 1420, 789 West Pender Street, Vancouver 1.

METALS: Silver, zinc, copper, gold, lead.

DESCRIPTION:

The geology, exploration, and development history of the Silver Queen mine has been reviewed in detail in *Geology, Exploration, and Mining in British Columbia*, 1969.

During the past year, Nadina Explorations Limited has proceeded with a programme of outlining tonnage by drifting and raising on the main oreshoots. As a result, the ore now classified as proven above the Earl adit level (the 2600 level) is reportedly 475,000 tons, the probable reserves being 525,000 tons. All of this ore is in the Wrinch vein system, with approximately 38 per cent in vein No. 4, 32 per cent in vein No. 3, and 30 per cent in the Ruby extension vein. A typical sample of the blended ore assays 0.12 ounce per ton gold, 10 ounces per ton silver, 0.73 per cent copper, 1.6 per cent lead, and 9.5 per cent zinc.

The expanded workings on the Earl adit level are shown on Figure 13. During the past year, drifting on the Ruby extension vein has advanced about 850 feet, passing through the microdiorite, beyond a zone of coarse volcanic breccia into an altered quartz porphyry intrusion. At mid-point the vein swings sharply to the east from its normal southeasterly trend and becomes increasingly pyritic in character (*see* Plates VA and VB). Near the quartz porphyry contact the vein turns southeasterly again but it thins and its dip flattens markedly. Assay results on the sphalerite-rich and pyrite-rich segments of the vein are given in the accompanying table (*see* assays Nos. 3 and 4). In spite of the variation in mineralogy, precious metal values remain high.

At the northwest end of the Wrinch vein system the workings have advanced about 800 feet, vein No. 3 being intercepted and followed in microdiorite. Characteristically, the vein contains abundant rhodochrosite and numerous cavities lined with clear crystalline quartz and some pyrobitumen. Cockade structures and colloform banding is commonly well developed and symmetrical crustifications on the walls display the mineral paragenesis (*see* Plate VIA). In spite of the fact that the vein is severely splayed in places fair zinc and copper values are apparently sustained over mineable widths. The assay results on a sample taken across the

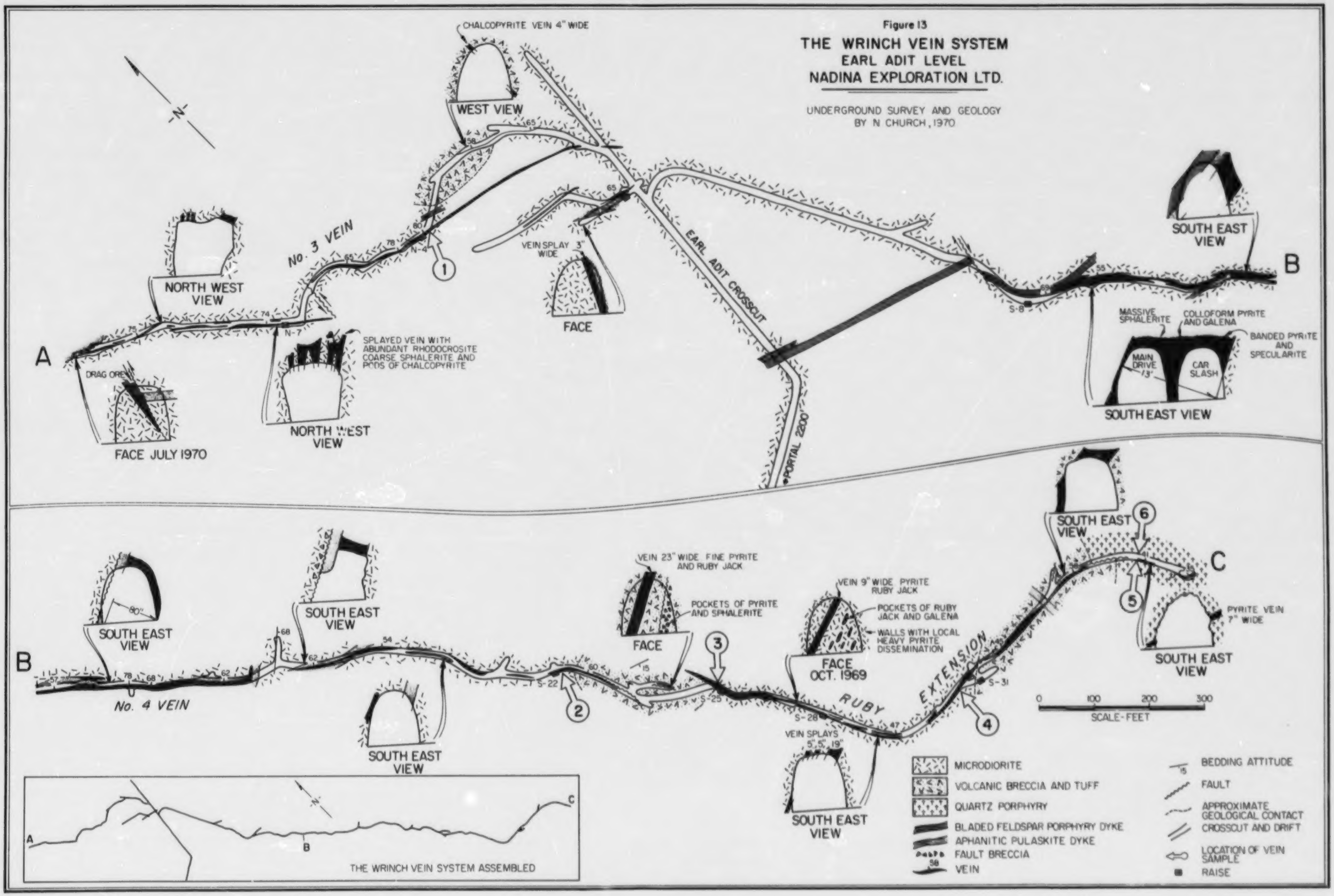


Figure 13

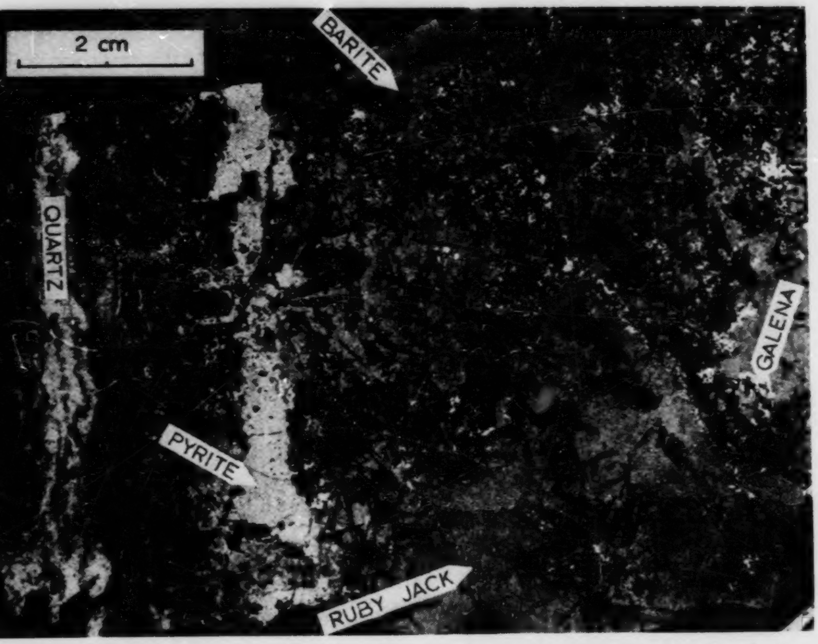
THE WRINCH VEIN SYSTEM
EARL ADIT LEVEL
NADINA EXPLORATION LTD.

UNDERGROUND SURVEY AND GEOLOGY
BY N CHURCH, 1970

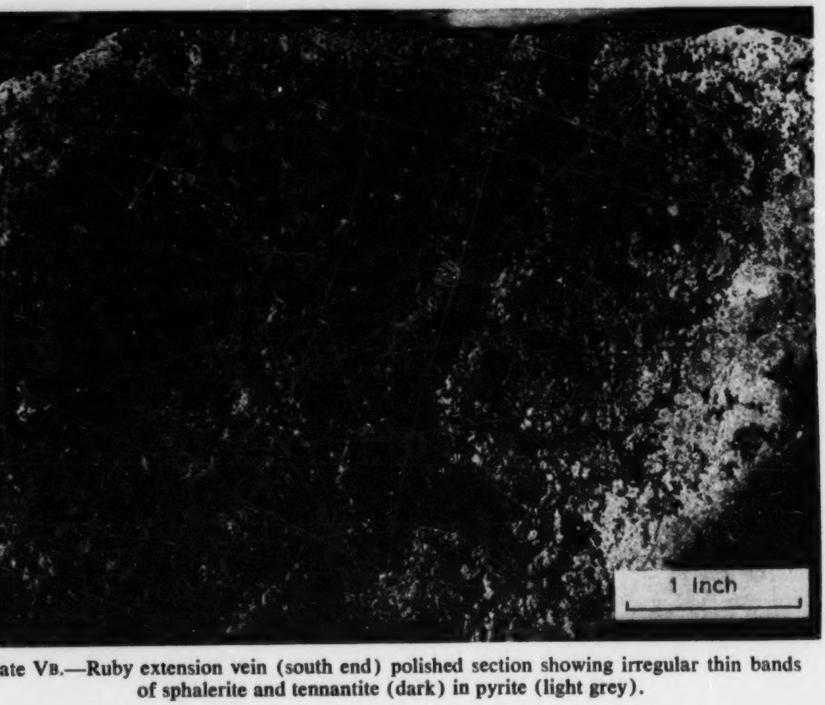
N
CHALCOPYRITE VEIN 4" WIDE
WEST VIEW
NO. 3 VEIN
NORTH WEST VIEW
A
DRAG ORE
FACE JULY 1970
SPLAYED VEIN WITH ABUNDANT RHODOCROSITE COARSE SPHALERITE AND PODS OF CHALCOPYRITE
NORTH WEST VIEW
N-4
N-7
1
VEIN SPLAY 3" WIDE
FACE
EARL ADIT CROSSCUT
PORTAL 2200
SOUTH EAST VIEW
B
S-8
MASSIVE SPHALERITE
COLLOFORM PYRITE AND GALENA
BANDED PYRITE AND SPECULARITE
MAIN DRIVE
13'
CAR SLASH
SOUTH EAST VIEW
B
No. 4 VEIN
80"
SOUTH EAST VIEW
SOUTH EAST VIEW
SOUTH EAST VIEW
S-22
2
VEIN 23" WIDE FINE PYRITE AND RUBY JACK
POCKETS OF PYRITE AND SPHALERITE
FACE
3
S-25
VEIN 9" WIDE PYRITE RUBY JACK
POCKETS OF RUBY JACK AND GALENA
WALLS WITH LOCAL HEAVY PYRITE DISSEMINATION
FACE OCT. 1969
S-28
RUBY EXTENSION
VEIN SPLAYS 5", 5", 19"
SOUTH EAST VIEW
S-31
4
SOUTH EAST VIEW
6
5
C
PYRITE VEIN 7" WIDE
SOUTH EAST VIEW
0 100 200 300
SCALE-FEET
MICRODIORITE
VOLCANIC BRECCIA AND TUFF
QUARTZ PORPHYRY
BLADED FELDSPAR PORPHYRY DYKE
APHANITIC PULASKITE DYKE
FAULT BRECCIA
VEIN
BEDDING ATTITUDE
FAULT
APPROXIMATE GEOLOGICAL CONTACT
CROSSCUT AND DRIFT
LOCATION OF VEIN SAMPLE
RAISE
A
B
C
N
THE WRINCH VEIN SYSTEM ASSEMBLED

Pl

Pl


2 cm
BARITE
QUARTZ
PYRITE
GALENA
RUBY JACK

ate VA.—Ruby extension vein polished section showing randomly arranged barite blades in sulphide matrix. (Reflected light.)



ate VB.—Ruby extension vein (south end) polished section showing irregular thin bands of sphalerite and tennantite (dark) in pyrite (light grey).

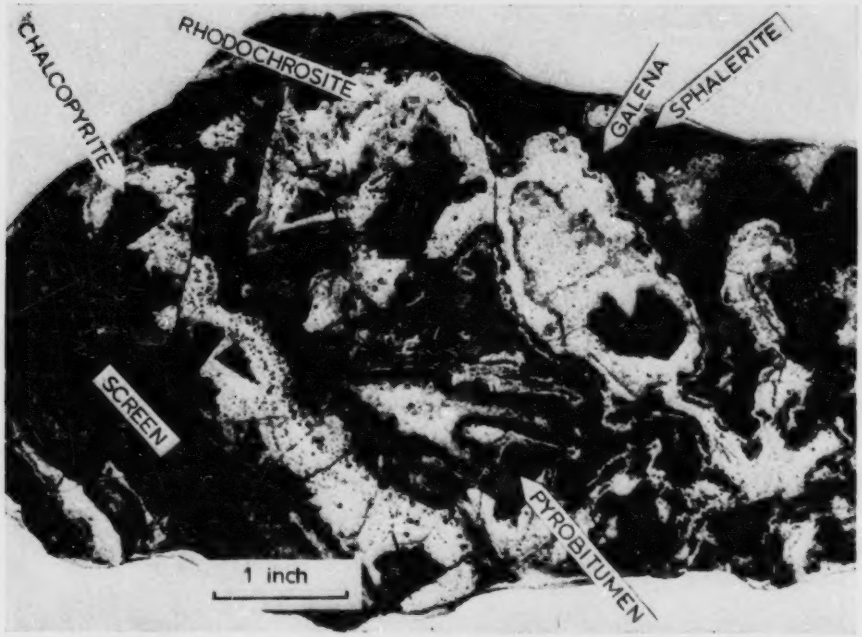

CHALCOPYRITE
RHODOCHROSITE
GALENA
SPHALERITE
SCREEN
PYROBITUMEN
1 inch

Plate VIA.—Vein No. 3 polished section showing typical cockade structure and colloform banding. (Plastic mount.)

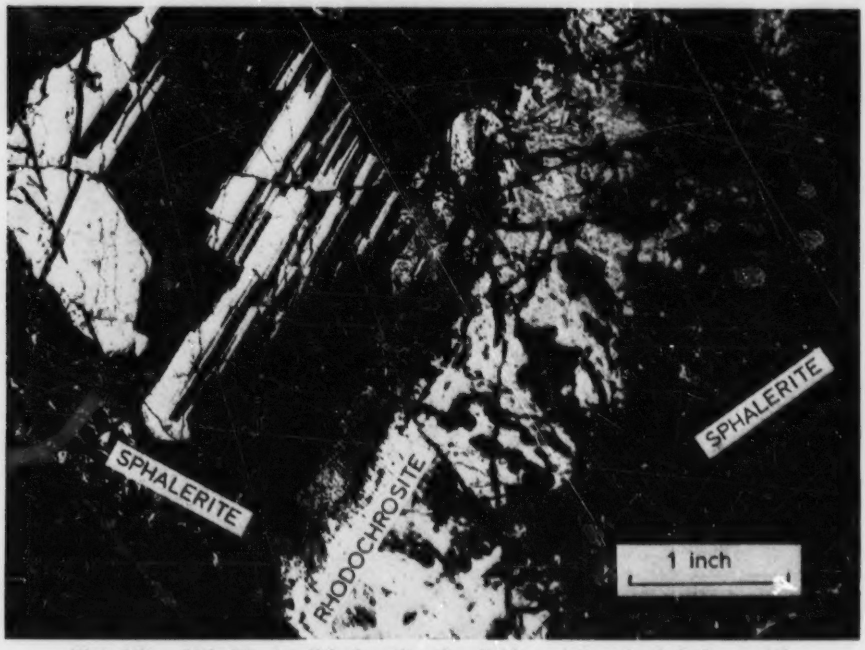

SPHALERITE
RHODOCHROSITE
SPHALERITE
1 inch

Plate VIB.—Vein No. 4 polished section showing large twinned sphalerite crystal. (Reflected light.)

vein near the exploratory raise N-4 is given in the accompanying table (*see* assay No. 1).

Vein No. 4 has been opened by raising both at the northwest and southeast ends on the Earl adit level in preparation for stoping. Compared to the other ore zones this vein shows good continuity and locally impressive thickness. Typically the ore is sphalerite-rich, although small lenses of chalcopyrite are not uncommon. As in the case of vein No. 3, the sulphide minerals are commonly coarse grained and at a few points individual crystals measure several inches in diameter (*see* Plate VIB). New assay results on a few samples taken across the vein in potential production zones are given in the accompanying table (*see* assays Nos. 2 and 7).

A regional geological survey in the Owen Lake, Parrott Lakes, and Goosly Lake area has augmented speculation on the origin of the veins and ore-bearing solutions. A line of syenomonzonite intrusions was discovered extending in projection from Nadina's Silver Queen mine 25 miles northeast to Kennco Explorations, (Western) Limited's copper-silver discovery near Goosly Lake (*see* Fig. 10). The replacement sulphide deposit on the Kennco property is immediately adjacent to a syenomonzonite stock (48.8 ± 3 m.y.) considered to be the source of mineralizing solutions.

The general impression is that the Nadina veins were emplaced at roughly the same time as a set of feldspar porphyry dykes. Also a deep magma similar in composition to the Goosly stock is thought to be the source for both the dykes and mineralizing solutions. A comparison of chemical analyses shows marked similarity of the Goosly stock and the feldspar porphyry dykes on the Nadina property, *see* analyses Nos. 1 and 2 in the accompanying table. It is further speculated that the Nadina vein system may change in form and mineralogy with depth eventually passing into a Goosly-type massive sulphide replacement orebody.

WORK DONE:

Exploration work includes four deep BQ diamond-drill holes totalling 8,524 feet, a number of shorter holes testing veins, roughly 5,000 feet, and underground drilling about 1,500 feet. Also, approximately 1,750 feet of drifting was added along the Wrinch vein system on the Earl adit level.

Mine development includes more than 1,200 feet of raising, about 350 feet of drifting, and stope slashing about 2,000 tons. The Earl adit crosscut was enlarged for a distance of 2,800 feet to facilitate ore haulage; heavier rail was laid to carry 5-ton cars and a new 8-inch air-line was installed.

The camp facilities were improved by the addition of a new powder magazine, warehouse, machine shop, core house, expansion of the assay office, addition of a new 20-man bunkhouse, and clearing a trailer camp-site.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1965, pp. 81–84; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 126–139.

Chemical Analyses of Intrusive Rocks

	1	2
SiO_2	53.22	52.80
TiO_2	1.28	1.82
Al_2O_3	16.72	16.95
Fe_2O_3	2.97	3.97
FeO	3.28	3.63
MnO	0.06	0.14
MgO	2.59	3.85
CaO	6.18	6.03
Na_2O	5.32	4.10
K_2O	3.42	3.30
H_2O-	0.50	0.18
H_2O+	2.51	1.90
CO_2	0.82	0.02
SO_3	0.22	0.01
P_2O_5	0.64	0.91
BaO	0.27	0.27

1. Bladed feldspar porphyry dyke from diamond-drill hole NGV-4, Nadina mine; analysis by S. Metcalfe, Analytical Laboratory, British Columbia Department of Mines and Petroleum Resources.

2. Syenomonzonite from the Goosly stock; analysis by S. Metcalfe, Analytical Laboratory, British Columbia Department of Mines and Petroleum Resources.

Assay Results From the Wrinch Vein System

		1	2	3	4	5	6	7	8	9
Ounces per ton	Au	0.07	0.30	0.20	0.24	0.12	0.09	0.11	0.04	0.18
	Ag	17.4	15.2	15.5	21.8	11.6	13.9	34.8	3.2	20.9
Per cent	Cu	2.48	0.16	0.25	0.30	0.62	0.64	2.28	0.05	1.09
	Pb	1.60	5.78	3.68	0.22	0.52	3.66	1.28	3.85	2.51
	Zn	12.2	18.5	7.9	3.6	1.7	16.50	8.9	16.0	10.2
	As	0.24	0.12	0.21	0.12	0.24	0.22	0.70	0.15	0.29
	Sb	0.04	0.07	0.05	0.05	0.09	0.09	0.60	0.04	0.16
	Cd	0.074	0.061	0.043	0.011	0.012	0.11	0.030	0.30	0.044
	Ba	0.07	4.11	1.21	0.82	3.48	1.99	0.03	0.60	1.25
	Fe	9.51	9.55	12.70	22.10	26.31	23.00	15.91	13.59	13.95
	Mn	7.44	3.64	0.12	0.032	0.14	0.19	8.00	14.36	3.84
	Bi	0.17	0.03	0.06	0.04	0.12	0.06	0.09	0.001	0.10
p.p.m.	Te	*Nil*	31.3	8.8	10.0	22	14.3	2.5	3.6	10.4
	Ga	10	43	50	38	30	25	8	79	29.8
	In	100	12	24	5	25	10	10	25	30.2
	Ge	*Nil*	45	8	10	8	13	12	20	15
	Hg	*Nil*	12	*Nil*	*Nil*	*Nil*	*Nil*	28	*Nil*	8
	Cu/Fe	0.261	0.017	0.019	0.013	0.024	0.028	0.143	0.004	0.078
	Pb/Fe	0.168	0.606	0.290	0.010	0.020	0.159	0.080	0.282	0.198
	Zn/Fe	1.283	1.940	0.622	0.163	0.065	0.718	0.560	1.178	0.731
	Mn/Fe	0.782	0.382	0.009	0.001	0.005	0.008	0.503	1.055	0.275
	Cd/Zn	0.006	0.003	0.005	0.003	0.007	0.007	0.003	0.002	0.004
Weight per cent	Gangue	58	46	66	50	44	24	51	44	——
Inches	Sample width	27	33	27	51	9	6	95	60	-----

1. Vein No. 3, sample location immediately east of N-4 raise on the Earl adit level (*see* Fig. 13).

2. Vein No. 4, sample location immediately east of S-22 raise on the Earl adit level (*see* Fig. 13).

3. Ruby extension vein, sample location immediately north of S-25 raise on the Earl adit level (*see* Fig. 13).

4. Ruby extension vein, sample location immediately west of S-31 raise on the Earl adit level (*see* Fig. 13).

5. A small pyrite vein, sample taken about 100 feet northwest of the face on the Earl adit level south drift (*see* Fig. 13).

6. A small pyrite-sphalerite vein, sample from the northeast side of the drift opposite sample No. 5 (*see* Fig. 13).

7. Vein No. 4, sample location 15 feet northwest of S-18 raise on the upper level, about 2,000 feet from the portal in the south drift.

8. Vein No. 2, sample location in a trench about 350 feet north of Wrinch Creek canyon.

9. The average of production zones, analyses Nos. 1, 2, 3, 4, and 7.

DIAMOND BELLE (No. 146, Fig. C)

By B. N. Church

Location: Lat. 54°06′ Long. 126°42′ (93L/2E)
Twenty miles south of Houston and 2 miles east of Owen Lake.

Claims: A total of 23 full claims and fractions, including DIAMOND BELLE, BLACK BEAR, ETHEL, IVAN Fraction, VAN.

Access: Twenty-seven miles from Houston via the Morice River and Owen Lake gravel roads and 2 miles east on dirt road to Cole Lake and the centre of the property.

Owner: FRONTIER EXPLORATION LIMITED, 642 Clark Drive, Vancouver 6.

Metals: Silver, copper, lead, zinc.

Description:

The geology of the Diamond Belle property of Frontier Exploration Limited was outlined in *Geology, Exploration, and Mining in British Columbia,* 1969. During the past year, new mineralization was discovered and a few of the older veins more clearly delineated by drilling and trenching.

According to company records, vein mineralization was intercepted by two diamond drill holes in a zone striking southeasterly parallel to the Diamond Belle vein and located about 250 feet to the northeast. The intersections show 3.4 feet assaying 0.07 ounce per ton gold, 18.6 ounces per ton silver, 1.3 per cent copper, 2.2 per cent lead, and 5.5 per cent zinc, and a second intersection of 2.2 feet assaying 0.11 ounce per ton gold, 6.1 ounces per ton silver, 0.11 per cent copper, 5.89 per cent lead, and 13.87 per cent zinc.

A second southeasterly striking vein was uncovered by trenching immediately west of an old pit 600 feet south of Cole shaft. The vein is partially obscured by thick manganese capping; however, it appears to be narrow and discontinuous, cropping out over a length of 160 feet.

The so-called Bear vein is located in the north central part of the Black Bear claim, approximately 1,000 feet southwest of Cole shaft. Bulldozer trenching in deep glacial drift has traced this southerly striking zone for roughly 220 feet. A chip sample taken by the writer across the most southerly exposure of this vein consists of almost pure amber sphalerite with minor pyrite carrying modest precious metal values (*see* the accompanying table, assay No. 3).

Resampling of the Cole vein system by the writer shows generally higher assay results than previously recorded. For example, a chip sample across the Diamond Belle vein 115 feet northwest of Cole shaft shows comparatively good silver and zinc grades; also sampling on the Shear vein 40 feet south of the road to Cole Creek gives assays three to five times higher in silver, copper, lead, and zinc than previous results (*see* the accompanying table, assays Nos. 1 and 2).

Assay Results From the Frontier Veins

		1	2	3
Ounces per ton	Au	0.02	0.05	0.19
	Ag	4.1	57.0	5.4
Per cent	Cu	0.15	2.01	0.61
	Pb	2.08	6.19	1.40
	Zn	12.1	12.7	32.7
	As	0.04	0.60	0.16
	Sb	0.08	0.23	0.18
	Fe	6.10	9.81	19.08
	Mn	7.70	3.07	1.95
	Ba	4.96	2.10	0.08
	Cd	0.035	0.40	0.19
	Bi	0.0041	0.40	0.002
p.p.m.	Te	*Nil*	1	1.2
	Ga	9	9	*Nil*
	In	*Nil*	9	19
	Ge	8	10	*Nil*
	Hg	*Nil*	9	*Nil*
	Cu/Fe	0.025	0.205	0.032
	Pb/Fe	0.342	0.630	0.0735
	Zn/Fe	1.98	1.295	1.65
	Mn/Fe	1.26	0.313	0.102
	Cd/Zn	0.003	0.031	0.006
Weight per cent	Gangue	67	52	10
Inches	Sample width	28	23	20

1. Diamond Belle vein, sample location 115 feet northwest of the Cole shaft.
2. Shear vein, sample location 40 feet south of the road to Cole Creek.
3. Bear vein, sample location approximately 1,000 feet southwest of the Cole shaft, a 20-inch-wide sample taken across the vein at a point about 220 feet south of an access road at the north end of the vein.

WORK DONE: Intense investigation of the property was performed with geological mapping on the scale of 1 inch to 40 feet, geophysical work including 10 line-miles of magnetometer and electromagnetic surveys, and about 10,000 feet of trenching in search of veins. The subsurface investigation included 17 diamond-drill holes totalling 10,674 feet and 17 percussion holes totalling 1,280 feet. Approximately 2 miles of new access roads was constructed.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1916, pp. 144, 159; 1923, pp. 114, 116; 1925, p. 142; 1927, p. 139; 1928, p. 170; 1966, p. 104; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 139–141.

ARK (No. 132, Fig. C)

By B. N. Church

LOCATION: Lat. 54°05′ Long. 126°45.5′ (93L/2W)
Twenty miles south of Houston, on the west side of Owen Lake.

CLAIMS: ARK, 54 contiguous claims.

ACCESS: About 27 miles from Houston via the Morice River and Owen Lake gravel roads, thence about 3 miles by dirt road to a tourist lodge and the north boundary of the claims.

OWNER: ARCADIA EXPLORATIONS LTD., 1123, 409 Granville Street, Vancouver 2.

DESCRIPTION: The Ark claims are on the west side of Owen Lake, directly across the lake from the Nadina mine camp-site (*see* Fig. 10). A brief geological reconnaissance of the property shows that it is underlain mainly by andesite lava and breccias similar to the Tip Top Hill volcanics found on the Nadina property. The results of a geochemical survey indicate zinc and silver anomalies in analysed soils from the north part of the claim group. It has been suggested by company officials that this may indicate an extension of the Nadina vein system across Owen Lake. Exploration is reported as being hampered somewhat by local thick deposits of glacial drift.

WORK DONE: Line-cutting, 34.5 line-miles; a geochemical survey including analysis of 697 soil samples for silver, copper, and zinc, also 127 of these samples analysed for lead; a ground magnetometer survey; bulldozer trenching.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 122–126; Assessment Report 2284.

JIM (No. 126, Fig. C)

By B. N. Church

LOCATION: Lat. 54°01.7′ Long. 126°48′ (93L/2W)
Immediately northeast of Duck Lake, 20 miles south of Houston.

CLAIMS: JIM 1 to 50.

ACCESS: Thirty-one miles by gravel road from Houston.

OWNER: DELBROOK MINES LIMITED, 4470 Glencanyon Drive, North Vancouver.

DESCRIPTION: The object of the exploration programme in this area is to investigate the anomalous high shown on Geological Survey of Canada aeromagnetic map No. 5301G (Owen Lake). The property is centred on part of the Duck Lake biotite-plagioclase porphyry stock (*see* Fig. 10). Although the area is covered by considerable glacial drift, the north contact of the stock has been located near Peter Aleck Creek. Sheared Mesozoic andesite lavas are found cropping out in the creek and immediately to the north. A number of geochemical and geophysical anomalies have been delineated for future investigation.

WORK DONE: An induced polarization survey over 6.5 line-miles.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 141; Assessment Report 2288.

NAD (No. 86, Fig. C)

LOCATION: Lat. 54°05′ Long. 126°51′ (93L/2W)
Five miles east of Owen Lake.

CLAIMS: NAD, totalling 304.

ACCESS: From Smithers by helicopter, 47 air miles.

OWNER: NIPPON MINING OF CANADA LTD., 607, 475 Howe Street, Vancouver 1.

DESCRIPTION: The central part of Nadina Mountain is underlain by biotite quartz monzonite of Middle Eocene age, which intrudes clastic sedimentary rocks mapped as part of the Upper Cretaceous-Early Tertiary Sustut Group. Weak pyrite mineralization was noted at the northern part of the mountain.

WORK DONE: Reconnaissance surface geological mapping and geochemical soil survey, 800 samples covering all claims.

FAR (GRUBSTAKE) (No. 121, Fig. C)

By B. N. Church

LOCATION: Lat. 54°08.8′ Long. 126°52.4′ (93L/2W)
On Tsalit Mountain, approximately 18 miles southwest of Houston.

CLAIMS: FAR 1 to 4, GAL 1 to 4, and approximately 30 others.

ACCESS: Twenty miles from Houston via the Morice River road and Owen Lake road, then 4 miles west along a four-wheel-drive track to the upper south slope of Tsalit Mountain.

OWNERS: G. O. M. STEWART and R. BLUSSON.

METALS: Silver, copper, zinc, molybdenum.

DESCRIPTION:

Introduction

Prospecting activity has increased markedly in the general area south of Houston with recent major mineral discoveries near Goosly Lake and some important mine development work at Owen Lake. In the light of this activity it seems appropriate to update the published information on some of the more interesting mineral showings such as exemplified in the Tsalit Mountain area. This report deals with the general geology of the Tsalit Mountain area and reviews three mineral prospects —the grubstake showing, the summit showing, and the north slope prospect.

Prospecting History

The original grubstake showing was discovered by P. Pouport in 1929 on the upper south slope of Tsalit Mountain. This proved to be mainly a silver-copper prospect, although early reports indicate the presence of some molybdenum mineralization in the area.

Apparently there was little or no work done until June 1965, when the Far claims were staked by E. Westgarde covering the showing. In mid-1966 these claims were integrated with a large block and formed the nucleus of Normont Copper Ltd. According to company reports, in late 1966 an intense exploration programme was undertaken which included line-cutting, geological mapping, access road construction, geochemical soil-sampling, stripping, blasting, and surface-sampling.

During this time the area in which mineralization is known was increased from just a few scattered trenches to an area measuring roughly 1,000 by 400 feet. Also, molybdenum mineralization was discovered in volcanic rocks near the summit of the mountain, about 2,500 feet north of the grubstake showing. Since pyrrhotite proved to be an important mineral at both showings, a detailed magnetometer survey was carried out. Subsequently, about 12 short diamond-drill holes were put down to test magnetic anomalies in the grubstake area.

Almost contemporaneous with the activity on the Far claims, Amax Exploration, Inc. was investigating molybdenum mineralization in the area of a granite intrusion on the north slope of Tsalit Mountain. In 1964, anomalous molybdenum concentrations were found in silts along the course of Tsalit Creek draining the north slope. In 1965 geological and geochemical surveys delineated an area underlain by granite west of Tsalit Creek averaging 26 p.p.m. Mo in soils. This area is approximately 1½ miles north of the grubstake showing.

Prospecting interest has been revived after a short dormant period. Anaconda American Brass Limited is currently investigating silver-zinc geochemical anomalies on their Code claims located immediately west of Tsalit Mountain. Also the grubstake and summit prospects were recently acquired by R. Blusson and G. O. M. Stewart, of Vancouver, who are apparently reactivating exploration in the area.

Physiography

The top of Tsalit Mountain is saddle-shaped, with a summit horn on the east side at an elevation of 4,500 feet. The east face rises sharply above the gentle slopes of the valley of Owen Creek at 2,500 feet. A westerly knob, lying a few hundred feet lower than the summit, overlooks the broad arched back of the mountain and low swampy rolling terrain to the northwest near Fenton Creek.

Owen Hill is a prominent granite knob located immediately north of Tsalit Mountain. A fire lookout station at the top of the hill at 3,500 feet provides a panoramic view of the Morice River region beyond the north boundary of the map-area.

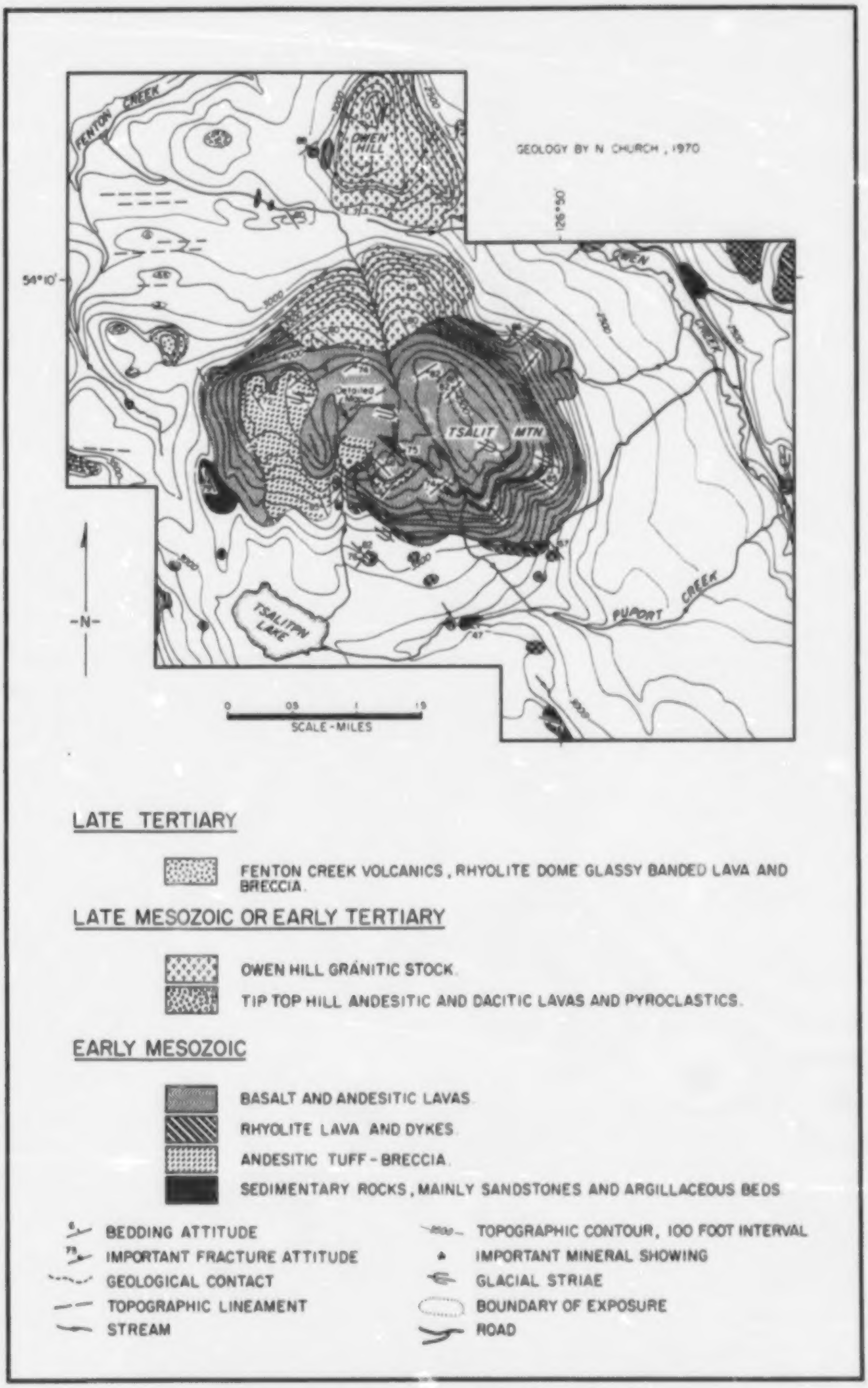

FENTON CREEK
OWEN HILL
GEOLOGY BY N CHURCH, 1970
126°30'
54°10'
OWEN CREEK
TSALIT MTN
TSALITPIN LAKE
PUPORT CREEK
-N-
0 0.5 1 1.5
SCALE-MILES
LATE TERTIARY
FENTON CREEK VOLCANICS, RHYOLITE DOME GLASSY BANDED LAVA AND BRECCIA.
LATE MESOZOIC OR EARLY TERTIARY
OWEN HILL GRANITIC STOCK.
TIP TOP HILL ANDESITIC AND DACITIC LAVAS AND PYROCLASTICS.
EARLY MESOZOIC
BASALT AND ANDESITIC LAVAS.
RHYOLITE LAVA AND DYKES.
ANDESITIC TUFF-BRECCIA.
SEDIMENTARY ROCKS, MAINLY SANDSTONES AND ARGILLACEOUS BEDS.
BEDDING ATTITUDE
IMPORTANT FRACTURE ATTITUDE
GEOLOGICAL CONTACT
TOPOGRAPHIC LINEAMENT
STREAM
TOPOGRAPHIC CONTOUR, 100 FOOT INTERVAL
IMPORTANT MINERAL SHOWING
GLACIAL STRIAE
BOUNDARY OF EXPOSURE
ROAD

Figure 14. Geology of the Tsalit Mountain area.

Tsalitpn Lake and the upper part of Puport Creek occupy a broad glacier-carved hanging valley located between Tsalit and Nadina Mountain to the south. The lower section of Puport Creek is cut deeply into morainal material which merges with a broad zone of glacial drift in Owen Valley.

The mean glacial striæ direction on Tsalit Mountain is 113 degrees; a single measurement east of Owen Creek gives 178 degrees.

Except for a burn extending from the north slope of Nadina Mountain to the upper course of Puport Creek, the area is well wooded with stands of lodgepole pine and spruce.

General Geology

The geology of the Tsalit Mountain area is shown on the accompanying map (Fig. 14). The bedrocks consist of an assortment of Mesozoic and Tertiary volcanic and sedimentary rocks and a large granite intrusion.

A suite of Early Mesozoic rocks underlies most of the map-area and is host to the mineral deposits on Tsalit Mountain. The lowest part of this sequence consists of argillite beds exposed along Puport Creek and east of Owen Creek in the northeast part of the map-area. The argillite is overlain by a thick rhyolite unit cropping out to the north and south of the upper course of Puport Creek and east of Owen Creek. The upper part of this sequence is about 1,000 feet thick, consisting mainly of volcanic rocks exposed on Tsalit Mountain. On the east part of the mountain the rocks are dark amygdaloidal basalt and andesite lavas with a few thin intercalated rhyolite marker flows. To the west, a thick lens-shaped body of tuff breccia is found near the top of a basalt-andesite lava pile.

The strong bimodal composition characteristic of the Early Mesozoic volcanics is well displayed by arc-fusion analyses of 70 representative lava specimens (*see* Fig. 15). An estimate of the bulk composition of these rocks shows 20 per cent basalt, 40 per cent basaltic andesite, 10 per cent dacitic andesite, and 30 per cent rhyolite; dacite lavas and pyroclastic rocks are scarce. Chemical analyses of basic and acid end representatives are given in the accompanying table.

Chemical Analyses of Tsalit Mountain Volcanic Rocks

	1	2
SiO_2	49.90	79.00
TiO_2	1.12	0.08
Al_2O_3	17.38	13.04
Fe_2O_3	1.24	0.34
FeO	5.87	0.28
MnO	0.17	0.04
MgO	5.29	0.23
CaO	9.12	1.33
Na_2O	3.11	2.82
K_2O	0.95	2.31
H_2O-	0.02	0.03
H_2O+	5.33	0.27
CO_2	0.01	0.01
P_2O_5	0.22	0.01
SrO	0.04	0.005
BaO	0.07	0.12
R.I. (arc fusion)	1.572	1.495

1. Amygdaloidal basaltic lava on Tsalit Mountain, 0.6 mile north of the grubstake showing at the elevation of 4,250 feet.
2. Flow banded rhyolite lava on Tsalit Mountain, 0.5 mile southeast of small lake near summit and 0.8 mile north of Puport Creek at the elevation of 4,100 feet.

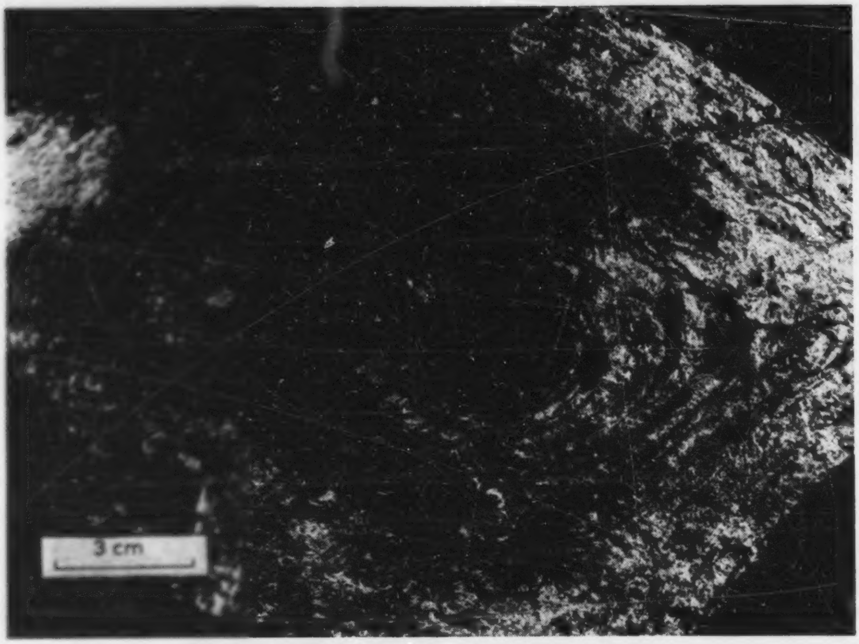


Plate VIIA.—Tsalit Mountain. Flow-banded rhyolite.

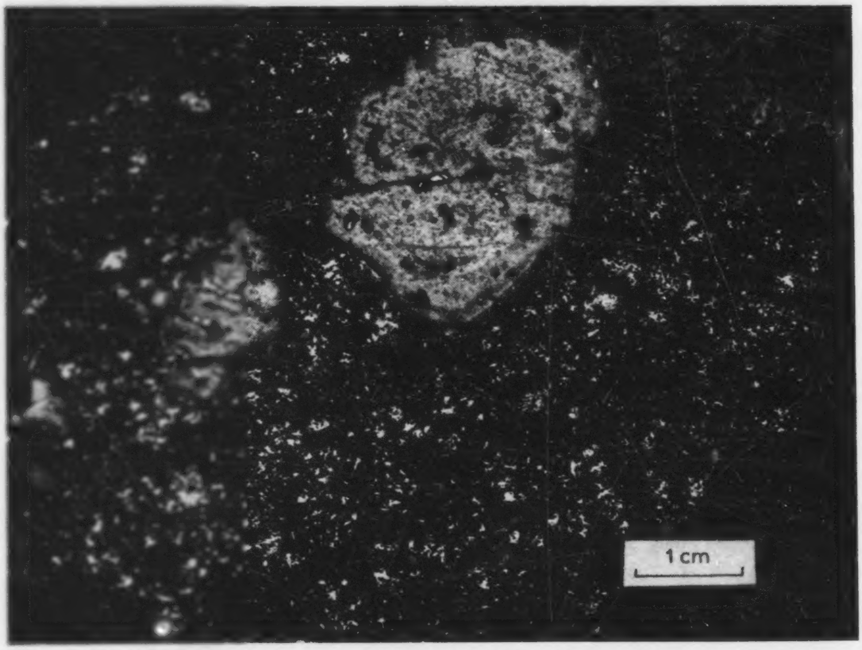


Plate VIIB.—Tsalit Mountain, grubstake showing. Mineralized tuff breccia. Pyrrhotite, chalcopyrite, sphalerite, and pyrite replacing matrix. (Bright grains in reflected light.)

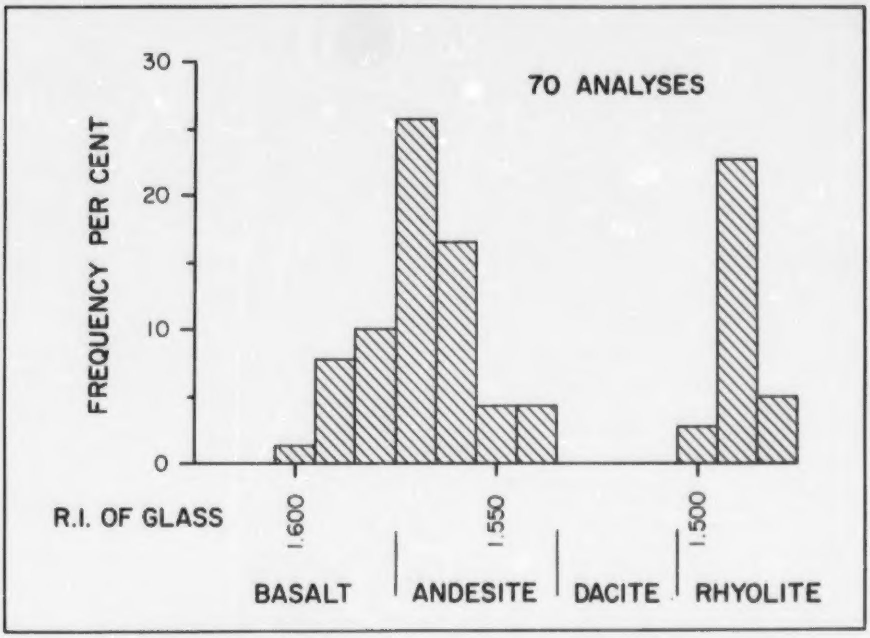


Figure 15. Composition frequency distribution of the Tsalit Mountain volcanic rocks.

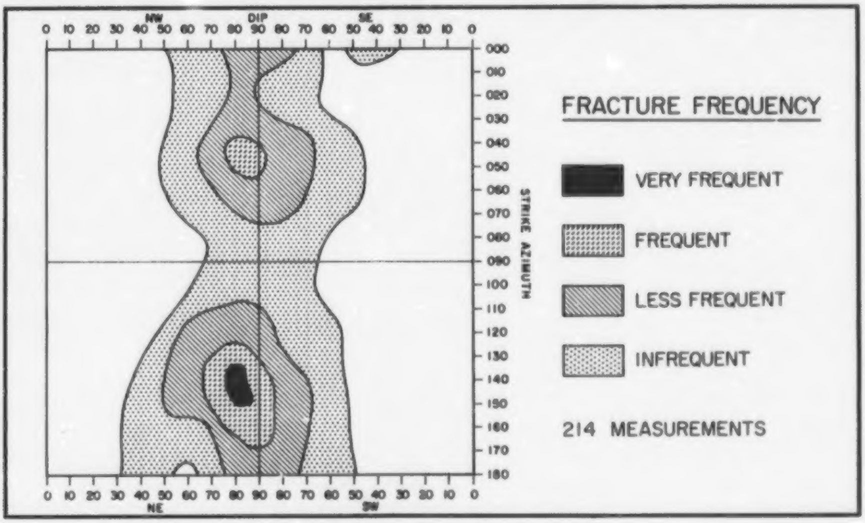


Figure 16. Fracture frequency plot for Tsalit Mountain area.

In general, these rocks have attained the epidote-amphibolite grade of regional metamorphism. Evidence of dynamic metamorphism is scarce; however, a sandstone-pebble conglomerate unit cropping out near the south boundary of the map-area contains markedly elongated fragments.

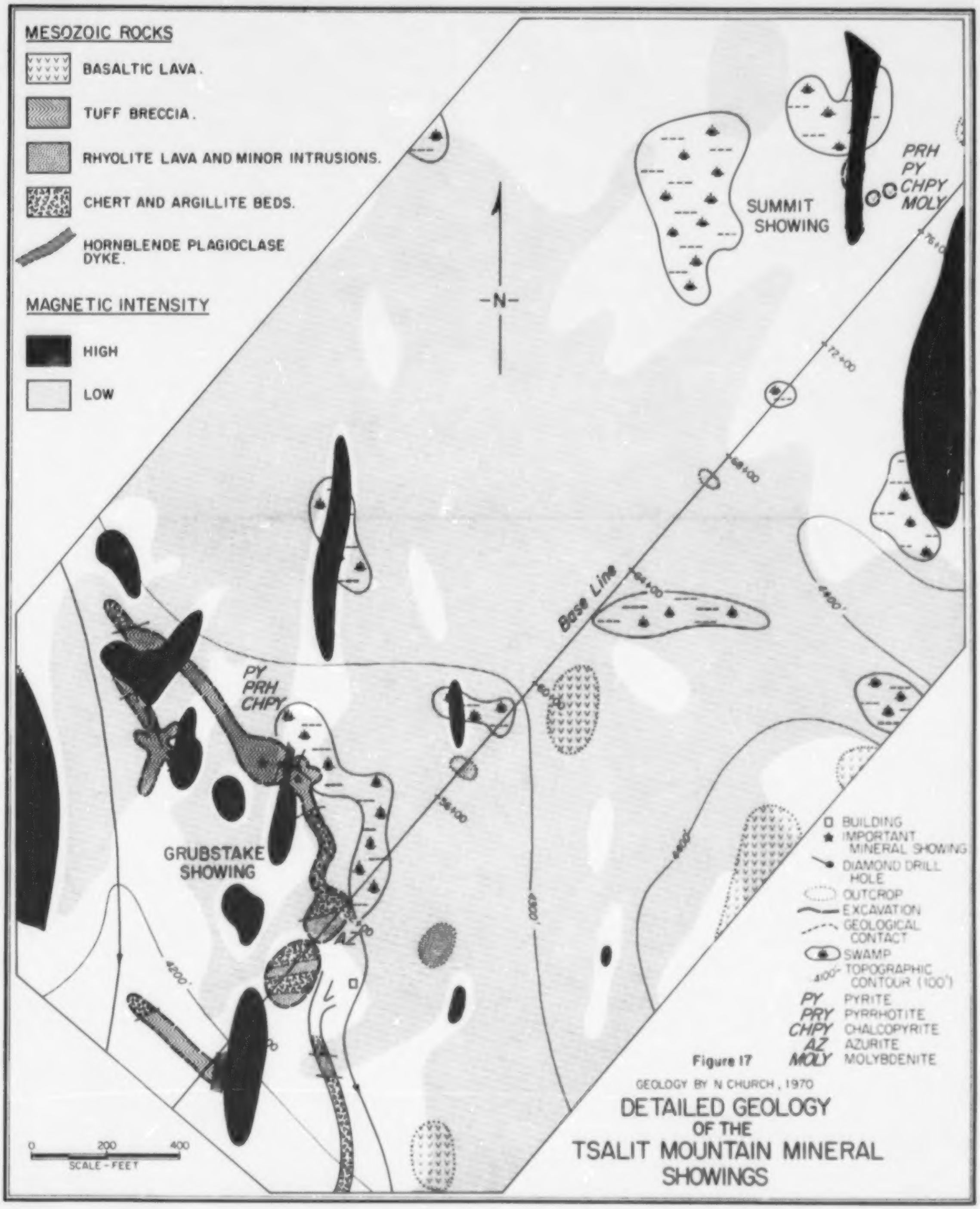

MESOZOIC ROCKS
BASALTIC LAVA.
TUFF BRECCIA.
RHYOLITE LAVA AND MINOR INTRUSIONS.
CHERT AND ARGILLITE BEDS.
HORNBLENDE PLAGIOCLASE DYKE.
MAGNETIC INTENSITY
HIGH
LOW
N
SUMMIT SHOWING
PRH
PY
CHPY
MOLY
76+00
72+00
68+00
64+00
60+00
56+00
Base Line
4400'
4300'
4200'
PY
PRH
CHPY
GRUBSTAKE SHOWING
AZ
BUILDING
IMPORTANT MINERAL SHOWING
DIAMOND DRILL HOLE
OUTCROP
EXCAVATION
GEOLOGICAL CONTACT
SWAMP
4100' TOPOGRAPHIC CONTOUR (100')
PY PYRITE
PRY PYRRHOTITE
CHPY CHALCOPYRITE
AZ AZURITE
MOLY MOLYBDENITE
0
200
400
SCALE - FEET

Figure 17

GEOLOGY BY N CHURCH, 1970

DETAILED GEOLOGY
OF THE
TSALIT MOUNTAIN MINERAL
SHOWINGS

A series of andesite lavas and breccias thought to be Late Mesozoic or Early Tertiary age is exposed in the area drained by Fenton Creek west of Tsalit Mountain and east of Owen Creek on the east boundary of the map-area. These rocks resemble the Tip Top Hill volcanics in the Owen Lake area and clearly exhibit a lower grade of metamorphism than the rocks described above. The unit is widely distributed throughout the region and more or less flat lying.

The youngest rocks are fresh glassy rhyolite lavas and breccia cropping out in a small area between Tsalit Mountain and Fenton Creek. The rocks are somewhat eroded, displaying a number of semicircular structures possibly representing the flanks of a dissected Pliocene rhyolite dome.

A granite stock cropping out on Owen Hill and the north slope of Tsalit Mountain is the only sizeable igneous intrusion in the area. Modal analysis of five etched and stained hand specimens gives an average composition of 30 per cent quartz, 29 per cent potassium feldspar, 35 per cent plagioclase, and 6 per cent combined biotite and other ferromagnesian minerals. Locally near the margin of the granite, the volcanic rocks are silicified and altered to hornfels with scattered pyrite.

The intrusion appears to have lifted the rocks of the north side of Tsalit Mountain, tilting the beds gently to the south.

A statistical plot of joints and cleavages shows that the main fracture direction in the Tsalit Mountain area strikes about 140 degrees dipping 80 degrees northeast; a strong cross-joint system strikes about 045 degrees dipping 85 degrees northwest (*see* Fig. 16).

Topographic lineaments in the Fenton Creek area have a distinct easterly trend, whereas major fissures visible on Owen Hill trend northeast and southerly. The main lineaments on Tsalit Mountain strike south and southeasterly subparallel to the strong joint set found in the area.

Mineralization

The detailed geology of the area near the grubstake and summit showings on Tsalit Mountain is given on Figure 17. The main geological units are dark basaltic lava flows, rusty weathering tuff breccia, flow-banded rhyolite lava, chert, and argillite.

Some of the original trenching in the grubstake area is near station 52+00 NE. on the base-line. The host rocks here are sheared and sericitized rhyolite with patchy azurite staining. A 10-foot-wide sampled section of the shear zone assayed 6.8 ounces per ton silver and 0.9 per cent copper (*Minister of Mines, B.C.*, Ann. Rept., 1929, p. C 175).

The main mineralized zone is exposed in a trench about 600 feet north of the shear. The host rock is tuff breccia, consisting locally of andesitic matrix and rhyolite breccia fragments. Pyrrhotite, chalcopyrite, sphalerite, and pyrite have selectively replaced the matrix and penetrated cracks in the coarse fragments (*see* Plate VIIB). A sample across 45 feet reportedly assays 0.6 ounce per ton silver and 0.4 per cent copper (*Minister of Mines, B.C.*, Ann. Rept., 1929, p. C 175). A recent assay of a well-mineralized grab sample from the same area gave 0.4 ounce per ton silver, 0.26 per cent copper, 0.12 per cent zinc, 10.72 per cent iron, 160 p.p.m. nickel, and 0.02 per cent carbon dioxide. Also, similar mineralization is visible in trenches and pits several hundred feet to the north and east. A company report quotes seven assays on grab samples from this area averaging 0.9 ounce per ton silver and 0.18 per cent copper.

The magnetic background in the vicinity of the grubstake showing is low or intermediate intensity. In areas of pyrrhotite concentration, the magnetic intensity is generally high as might be expected. A ridge of high magnetic intensity trends

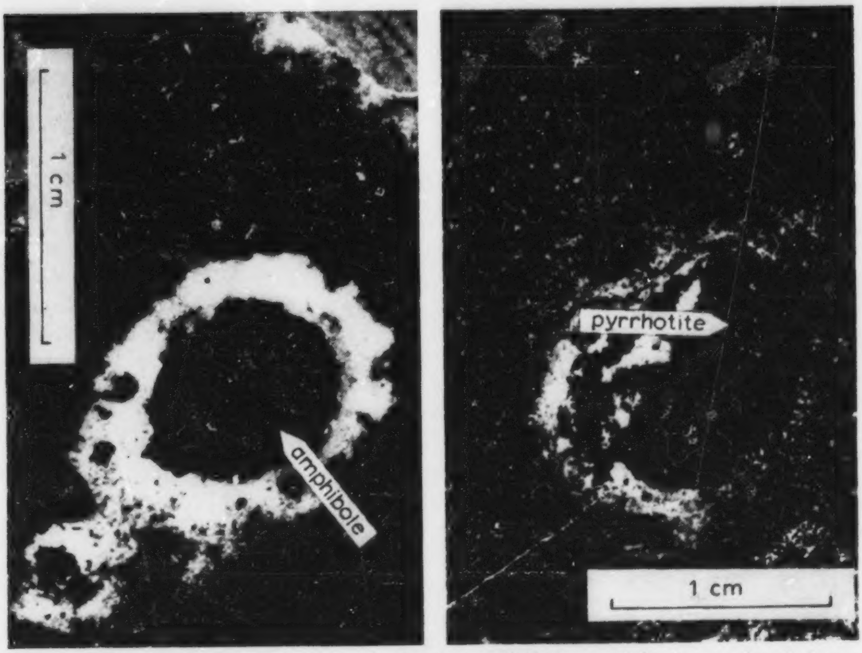

1 cm
amphibole
pyrrhotite
1 cm

Plate VIIIA.—Tsalit Mountain, summit showing. Silicified amygdales in metabasalt lava filled mainly with amphibole and pyrrhotite.

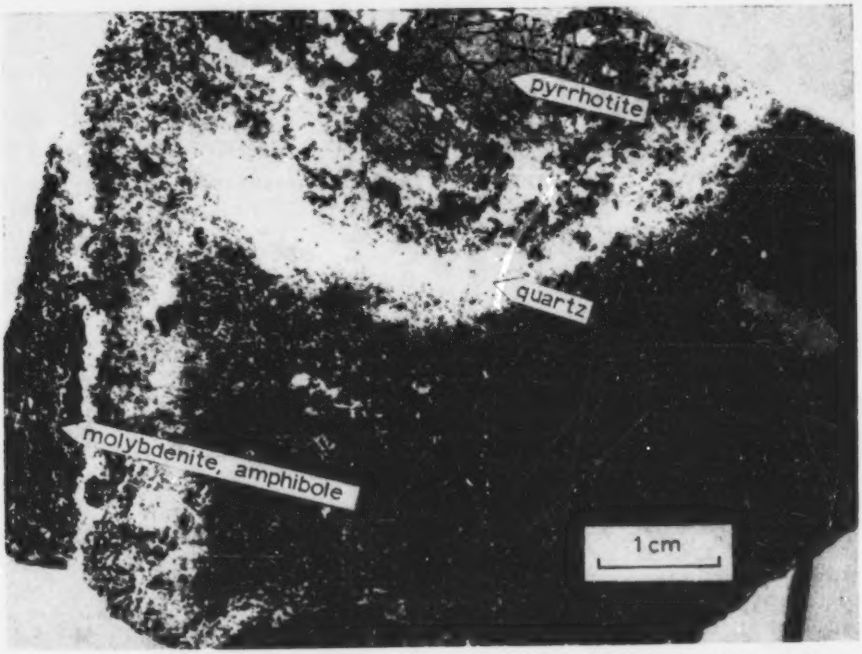

pyrrhotite
quartz
molybdenite, amphibole
1 cm

Plate VIIIB.—Tsalit Mountain, summit showing. Amygdale and fracture in metabasalt lava filled with quartz, amphibole, pyrrhotite, and molybdenite.

northerly bisecting the area; however, this anomaly appears to coincide with a medium-grained basic dyke. (Modal analysis of the dyke shows 38 per cent hornblende, 52 per cent plagioclase, 3 per cent chlorite, 5 per cent quartz, 1 per cent magnetite and opaque minerals, and a trace of apatite.)

The summit showing is a few hundred feet northwest of station 76+00 NE. on the base-line. The exposures consist of five pits, one of which contains mineralized amygdaloidal basalt. The rocks are locally hornfelsed and fractures and amygdules are filled with quartz, calcite, amphibole, and concentrations of pyrrhotite, molybdenite, minor pyrite, and chalcopyrite (*see* Plates VIIIA and VIIIB). Analysis of a grab sample of mineralized basalt shows 294 p.p.m. copper, 50 p.p.m. lead, 111 p.p.m. zinc, 310 p.p.m. molybdenum, and 159 p.p.m. nickel. A magnetometer survey in this area failed to delineate the mineralized areas, the background response being generally high over the basalt.

The north slope occurrence was not examined in detail by the writer. However, according to company reports, the Owen Hill granite is not well exposed on the north slope of Tsalit Mountain, the mineralized zones being located mainly by soil geochemistry. Flakes of molybdenite, specularite, and grains of pyrite are scattered through the granite west of Tsalit Creek. It is reported that seven chip samples in this area averaged 140 p.p.m. molybdenum and 66 p.p.m. copper. Also, four chip samples from pyritized volcanics near the granite contact averaged 291 p.p.m. molybdenum and 265 p.p.m. copper.

A small quartzofeldspathic porphyry intrusion exposed in the upper part of Puport Creek is compositionally similar to the Owen Hill granite and may be an apophysis of this body. The general impression is that the granite extends under Tsalit Mountain and, since it is itself mineralized, this body is probably the ultimate source of mineralizing solutions in both the grubstake and summit areas.

WORK DONE: Reroute of access road around washout west of Owen Creek.

REFERENCES: *Geol. Surv., Canada,* Sum. Rept., 1929, Pt. A, p. 91; *Minister of Mines, B.C.,* Ann. Rept., 1929, p. C 125.

CODE (No. 120, Fig. C)

By B. N. Church

LOCATION: Lat. 54°10.2′ Long. 126°57′ (93L/2W)
The property is located immediately northwest of Nadina Mountain and south of Morice River at the headwaters of Fenton Creek.

CLAIMS: A total of 198 claims, including 30 CODE claims and fractions.

ACCESS: The property is approximately 21 miles southwest of Houston and is serviced by two short access roads branching south from the main Morice River road.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METALS: Silver, lead, zinc.

DESCRIPTION:

Bedrock exposures are generally scarce, the area being well forested and covered locally with a thick mantle of glacial drift.

The mineralized zone is in the north central part of the property. Fine-grained pyrite and dark specks of sphalerite are disseminated throughout a wide area of bleached and highly altered acid volcanic rocks.

The mineralized rocks appear to be overlain by andesite and are cut by glassy dykes. The dykes probably emanate from a dome of vitric rhyolite in the east part of the property, and the andesites appear to be related to unmineralized andesites cropping out to the south.

The age of the mineralized acid volcanics is unknown; however, these rocks are possibly related to zones of Early Mesozoic rhyolite cropping out in the Tsalit Mountain area to the east. The andesite cover is probably correlative with the Late Mesozoic or Early Tertiary Tip Top Hill volcanic rocks of the Owen Lake area. The vitric rhyolite is a local deposit of almost certain Pliocene age.

WORK DONE: Access roads were generally improved, the west road being extended about 4½ miles to the centre of the property. Also, the old grid system was extended. A total of about 35 miles of cut-line and 680 feet of bulldozer trenching was completed. Approximately 2,200 silt, soil, and muskeg samples were collected and analysed for molybdenum, copper, lead, zinc, silver, iron, and manganese. Induced polarization and magnetometer surveys were performed on the property and a geological map was made on the scale of 400 feet to 1 inch.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1965, p. 81; 1967, p. 109; 1968, p. 139; Assessment Reports 799, 1229, 2734.

STARR CREEK

SR, PG, SC (No. 18, Fig. C)

LOCATION: Lat. 54°29′ Long. 127°32′ (93L/5E)
Between elevations of 3,500 feet and 4,000 feet in the Starr Creek basin, 25 miles southwest of Telkwa.

CLAIMS: SR, PG, SC, RB, TK, HK, BL, 96 in all.

ACCESS: By road from Telkwa, 25 miles.

OWNER: TELKWA MOUNTAIN MINES LTD., 5, 1045 West Pender Street, Vancouver 1.

METALS: Copper, silver.

DESCRIPTION: Copper and silver mineralization occur in fractures and as disseminations in Hazelton andesites and granitic intrusive rocks.

WORK DONE: Induced polarization survey, 12 line-miles; trenching, 1,600 feet on the SR 13 and SC 14 claims; stripping, 800 feet on the SR 12 claim; surface diamond drilling, three holes totalling 1,000 feet on the SC 14 claim; road constructed, 6 miles from road up Howson Creek from Telkwa River.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 91; Assessment Report 1623.

LOLJUH CREEK

JOE (No. 64, Fig. C)

LOCATION: Lat. 54°23′ Long. 127°13′ (93L/6E)
At approximately 5,000 feet elevation, astride Loljuh Creek, 23 miles due west of Houston.

CLAIMS: JOE 1 to 28.

ACCESS: By helicopter from Smithers, 30 miles.

OWNER: LOBELL MINES LIMITED, 4470 Glencanyon Drive, North Vancouver.

METALS: Silver, copper, lead, zinc.

DESCRIPTION: Mainly volcanic rocks of the Hazelton Formation. Rock types: trachyte, syenite, andesite, rhyolite, diabase, and basalt. Mineralization associated with faulting.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 600 feet on Joe 1 to 64; magnetometer survey, 27 line-miles; electromagnetic survey, 27 line-miles; geochemical survey, 231 soil samples and 79 silt samples.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 92; Assessment Report 2292.

SUNSETS CREEK

SUNSETS, FOG (No. 44, Fig. C)

Location: Lat. 54°30′ Long. 127°12′ (93L/6E)
At approximately 5,500 feet elevation, at the head of Sunsets Creek, about 5 miles east of Mooseskin Johnny Lake, 22 miles south of Smithers.

Claims: SL, FOG, SHERRY, totalling about 60.

Access: By helicopter from Smithers, 22 miles.

Owner: Whitesail Mines Ltd.

Operator: DUCANEX RESOURCES LIMITED, 2306, 401 Bay Street, Toronto 103, Ont.

Metals: Copper, molybdenum.

Description: Disseminated chalcopyrite and molybdenite are associated with several quartz-sericite alteration zones within a Tertiary acid intrusive stock.

Work done: Induced polarization, magnetometer, and electromagnetic surveys, 5 line-miles covering SL 1 to 24, and Fog 33 to 37 and 53 to 56; geochemical rock sample survey, 500 samples covering all SL claims and Fog 33 to 37 and 53 to 56; surface diamond drilling, three holes totalling 1,566 feet.

References: *Minister of Mines, B.C.,* Ann. Repts., 1914, p. 222; 1967, pp. 97–100; Assessment Reports 1605, 1922.

HOUSTON

LV (No. 2, Fig. C)

Location: Lat. 54°29′ Long. 126°36′ (93L/7E)
At approximately 3,200 feet elevation, 6 miles north of Houston.

Claims: LV and LAKEVIEW, totalling approximately 100.

Access: By road from Highway 16 at Houston, 6 miles.

Owner: ANNMAR MINING LTD., 3737 Napier Street, Burnaby 2.

Metals: Copper, silver.

Description: Volcanic and sedimentary rocks of Mesozoic age. Sediments consist of greywacke, siltstone, sandstone, and conglomerate. Volcanics—basalts, andesites, rhyolites.

Work done: Road construction, 1 mile on LV 37; trenching, 3,000 feet on LV 1 to 6, 37, 38, 110, and 122; surface diamond drilling, three holes totalling 120 feet on Lakeview and Lakeview 1; line-cutting.

References: *Minister of Mines, B.C.,* Ann. Repts., 1966, p. 102; 1968, p. 138; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 121; Assessment Reports 2145, 2732 (line-cutting).

ED (No. 125, Fig. C)

By B. N. Church

Location: Lat. 54°25.6′ Long. 126°38.6′ (93L/7E)
On the south slope of Mount Harry Davis (Microwave Hill) at an elevation of 2,600 feet, 1¾ miles due north of Houston.

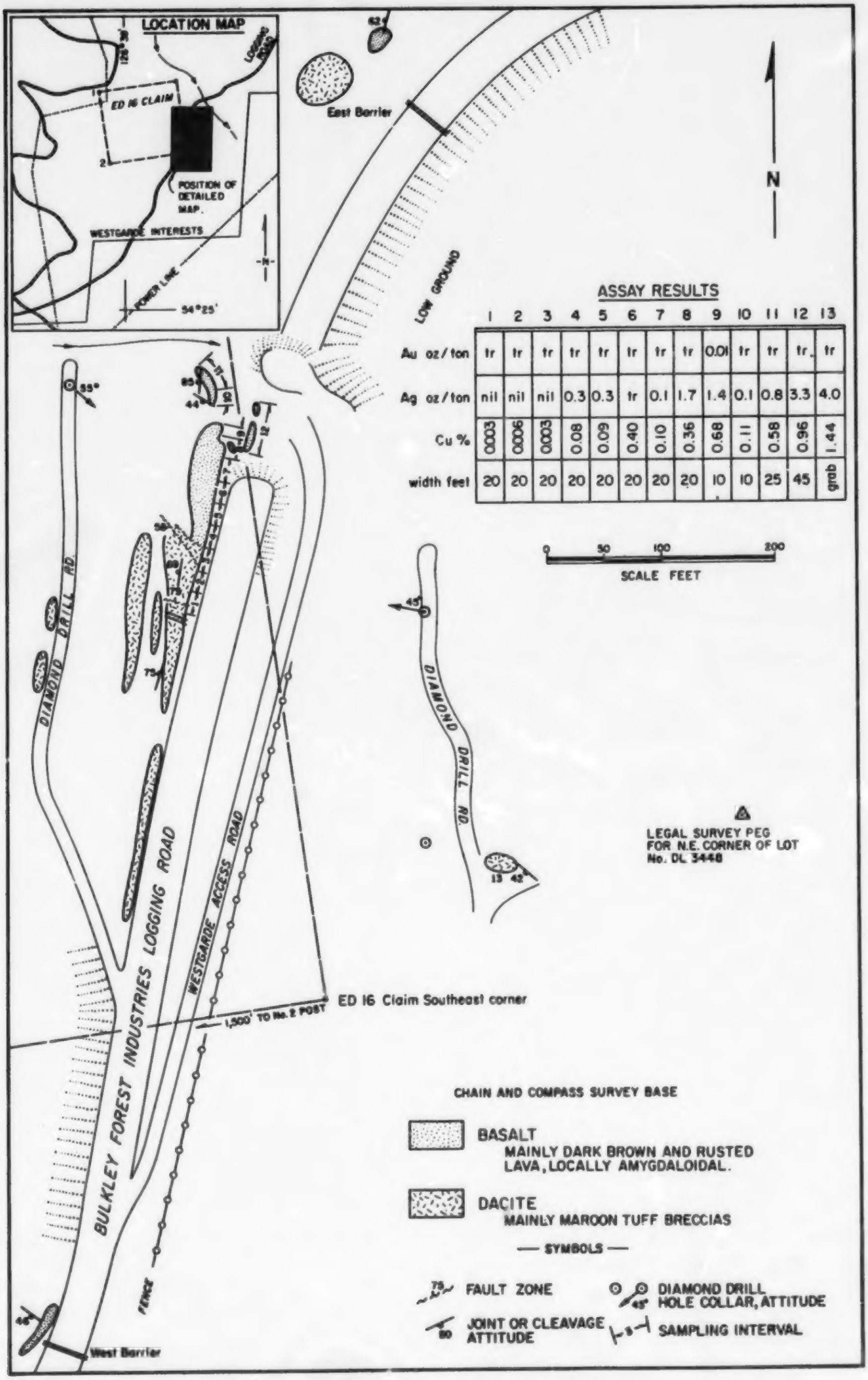
Claims: ED, STRIKE, AXE, WESTGARDE, and others, including approximately 70 claims in all.

Access: The property is traversed by the road to the microwave relay station located directly north of Houston.

Owners: Edward Westgarde, *et al.*

Operator: TEXAS GULF SULPHUR COMPANY, 701, 1281 West Georgia Street, Vancouver 5 (interest was released early in 1970).

Metals: Copper, silver.


LOCATION MAP
126°38'
LOGGING ROAD
ED 16 CLAIM
1
2
POSITION OF DETAILED MAP.
WESTGARDE INTERESTS
POWER LINE
54°25'
N
East Barrier
62
N
LOW GROUND
SCALE FEET
0
50
100
200
55°
85
44
10
11
12
19
50
60
75
75
45
13
42
DIAMOND DRILL RD.
BULKLEY FOREST INDUSTRIES LOGGING ROAD
WESTGARDE ACCESS ROAD
DIAMOND DRILL RD.
LEGAL SURVEY PEG FOR N.E. CORNER OF LOT No. DL 3448
ED 16 Claim Southeast corner
1,500' TO No. 2 POST
FENCE
44
West Barrier
CHAIN AND COMPASS SURVEY BASE
BASALT
MAINLY DARK BROWN AND RUSTED LAVA, LOCALLY AMYGDALOIDAL.
DACITE
MAINLY MAROON TUFF BRECCIAS
— SYMBOLS —
FAULT ZONE
DIAMOND DRILL HOLE COLLAR, ATTITUDE
JOINT OR CLEAVAGE ATTITUDE
SAMPLING INTERVAL

ASSAY RESULTS

	1	2	3	4	5	6	7	8	9	10	11	12	13
Au oz/ton	tr	tr	tr	tr	tr	tr	tr	tr	0.01	tr	tr	tr	tr
Ag oz/ton	nil	nil	nil	0.3	0.3	tr	0.1	1.7	1.4	0.1	0.8	3.3	4.0
Cu %	0003	0006	0003	0.08	0.09	0.40	0.10	0.36	0.68	0.11	0.58	0.96	1.44
width feet	20	20	20	20	20	20	20	20	10	10	25	45	grab

Figure 18. Geology of the Westgarde showing.

DESCRIPTION:

Introduction

Recent prospecting on Mount Harry Davis began early in 1965 when Westgarde and partners from Houston found scattered mineralization in Early Mesozoic volcanic rocks. A number of claims held by Westgarde covering this mineralization was examined by Molymine Explorations Ltd. in 1967. In 1969, Bulkley Valley Forest Industries began construction of a private logging-road joining Babine Lake and the new Houston sawmill. The road crossed the southeast part of ED No. 16 claim, exposing mineralization in a rock cut which had not been known previously. The Westgarde property was then optioned to Texas Gulf Sulphur Company and exploration continued with geochemical and induced polarization surveys and a diamond-drill programme. Later, to expand exploration, the Westgarde interests directed excavation of part of the new Babine logging-road, and a dispute arose with the logging company. Subsequently the Provincial Government proclaimed the road to be a public forest access road and mineral exploration was locally restricted.

Geology

The bedrock exposures on the logging-road and nearby diamond-drill access roads display two main lithological units; dark-brown, rusted basalt lava with minor breccia and maroon dacitic tuff breccias (*see* Fig. 18). These rocks have undergone intermediate to low grades of regional metamorphism and are thought to be part of the Hazelton Early Mesozoic assemblage.

The main zone of mineralization is in metabasalt near the Westgarde excavation. Chip samples taken from the rock cut trending subparallel to the road have an average assay of 0.3 per cent copper and 0.6 ounce per ton silver over a sampling width of 145 feet. A trench exposing mineralized basalt at the base of the road shows 0.96 per cent copper and 3.3 ounces per ton silver over a discontinuous sampling width of 45 feet. Maroon dacite tuff breccia in fault contact with the basalt to the south was chip-sampled, giving an average assay of only 0.004 per cent copper and no silver over 60 feet. Malachite-stained grab samples from an isolated maroon dacite exposure east of the logging-road assayed 1.44 per cent copper and 4 ounces per ton silver.

Detailed examination of polished slabs of mineralized basalt shows numerous subparallel hairline cracks filled with chalcopyrite and calcite and, in other samples, blebs of bornite, chalcopyrite, and chlorite were found filling and replacing small amygdules.

A statistical analysis of 50 joints and cleavages shows a strongly developed fracture system striking about 015 degrees dipping 70 degrees northwest and a weaker system striking about 125 degrees dipping 45 degrees southwest. The northerly direction is thought to be parallel to important faulting in the area which in turn may control the mineralization. This interpretation is supported by induced polarization data gathered by Texas Gulf Sulphur Company which show a series of northerly trending anomalies coincident with known faults and mineralization in the area.

WORK DONE: Trenching near the southeast corner of the ED 16 claim, including excavation of part of the Bulkley Forest Industries logging-road.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 121.

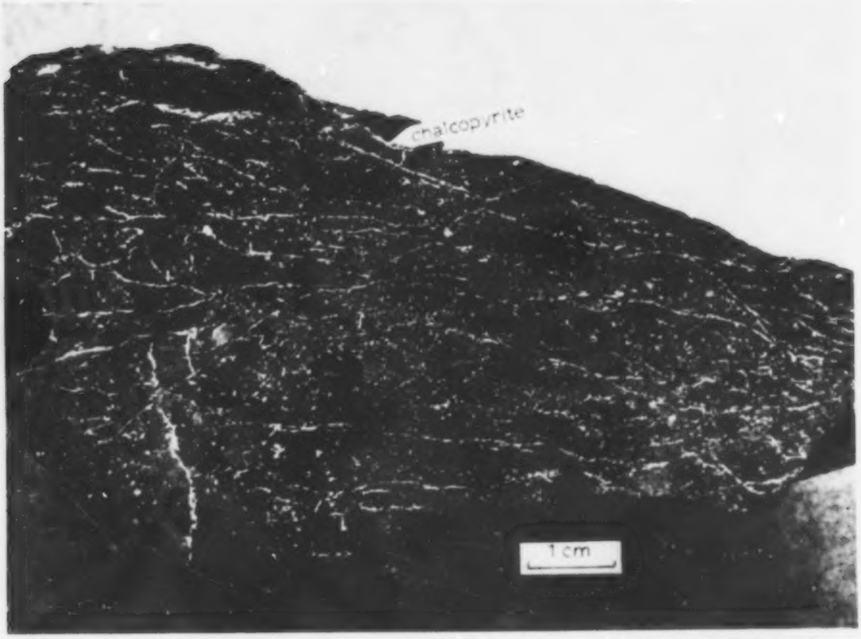

chalcopyrite
1 cm

Plate IXA.—Westgarde showing. Basaltic tuff breccia with cracks filled with chalcopyrite. (Reflected light.)

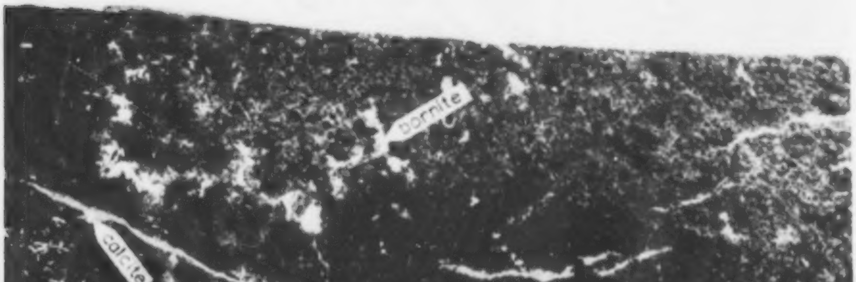

bornite
calcite
chlorite
1 cm

Plate IXB.—Westgarde showing. Metabasalt with blebs of bornite and chlorite and cracks with calcite. (Reflected light.)

BARB (No. 143, Fig. C)

By B. N. Church

Location: Lat. 54°24.9′ Long. 126°38.8′ (93L/7E)
Approximately 1 mile due north of Houston on the south slope of Mount Harry Davis.

Claims: BARB 3 to 6, 17, 19, and 37 other claims and fractions.

Access: From Houston via Highway 16 and a gravel road to the local microwave relay station.

Owner: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metal: Copper.

Description: The property is near the Westgarde copper-silver showing on Mount Harry Davis. Generally the area is well forested and bedrock exposures are scarce; however, a small mineralized exposure is found near the bend in the right-of-way of the British Columbia Hydro and Power Authority power transmission-line located about 3,600 feet south of the Westgarde showing. Some malachite and bornite is reported as occurring in fractured Hazelton andesite.

Work done: Reconnaissance geological survey.

Reference: Assessment Report 2544.

BEN (No. 131, Fig. C)

By B. N. Church

Location: Lat. 54°15′ Long. 126°33.5′ (93L/7E)
Eight miles due south of Houston, between Morice Mountain and Buck Creek.

Claims: BEN 1 to 20, RAY 21 to 73.

Access: Ten miles from Houston via the Buck Creek road.

Owner: DICTATOR MINES LTD., 305, 1033 West Pender Street, Vancouver 1.

Work done: Line-cutting, approximately 80 line-miles of grid.

References: *B.C. Dept. of Mines & Pet. Res.*, Map 69-1; Assessment Report 2623.

VAN, WYK (No. 148, Fig. C)

By B. N. Church

Location: Lat. 54°16′ Long. 126°46′ (93L/7W)
On the west side of Morice Mountain, approximately 7 miles southwest of Houston.

Claims: A total of 101 claims, including 17 VAN, 4 WYK; others are GERRY, BEVERLY, WID, POT, MOUNT.

Access: Fifteen miles from Houston via the Morice River road and a short access road to the camp-site, at the elevation of 3,000 feet.

Owner: J. Van der Wijk.

Operator: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metals: Silver, copper, molybdenum.

Description:

The property includes part of an area on the west side of Morice Mountain investigated by Amax Exploration, Inc. in 1966. Much of the current activity centres on two chalcopyrite showings located to the north and northeast of a small quartz porphyry stock and the old Amax camp-site.

The strata on the west side of Morice Mountain consist of a thick section of Early Mesozoic maroon dacitic tuff breccias, lahar deposits, and a few intercalated rhyolite flows and some rhyolite dykes.

The upper showing examined by Falconbridge is in a creek bed and side hill at about 4,900 feet elevation. Thin seams of chalcopyrite, pyrite, and quartz are found filling fractured dacitic volcanics.

The lower showing, above the Falconbridge camp-site at about 3,400 feet, consists of a shear zone near a dacite-andesite contact. The shear strikes about 165 degrees and is mineralized over a length of about 120 feet. According to company records, at one point a sample 8 feet wide taken across the shear zone assayed 0.3 ounce per ton silver and 2.8 per cent copper.

Work done: Geological mapping at the scale of 1 inch to 400 feet; geophysical work, including 6 line-miles of EM-16 survey and 3 line-miles of magnetometer survey; a geochemical survey, including collecting and analysis of 450 soil samples; and 860 feet of trenching.

References: Assessment Reports 797, 2844.

BARR, LYBDENUM (No. 1, Fig. C)

Location: Lat. 54°26′ Long. 126°52′ (93L/7W)
Between elevations of 2,400 and 3,700 feet, 4 miles west of Barrett.

Claims: BARR, LYBDENUM, BA, LB, CU, MAG, JANE, VANDOO, totalling 173.

Access: By 14 miles of road from Quick, on Highway 16.

Operator: FORTUNE CHANNEL MINES LTD., 500, 890 West Pender Street, Vancouver 1.

Metals: Molybdenum, copper.

Description: Molybdenum mineralization in altered granodiorite is present on the Barr claims.

Work done: Geochemical soil survey; magnetometer survey.

References: *Minister of Mines, B.C.*, Ann. Repts., 1966, p. 103; 1968, pp. 137, 138; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 122; Assessment Reports 1139, 2308, 2309.

ROSE LAKE

JEANIE (No. 42, Fig. C)

Location: Lat. 54°23′ Long. 126°01′ (93L/8E)
At approximately 2,500 feet elevation, one-half mile southeast of Rose Lake.

Claims: JEANIE, totalling 30.

Access: By road from Highway 16, three-quarters of a mile.

Owner: WHITESAIL MINES LTD., 202, 560 West Broadway, Vancouver 9.

Description: A complex anomaly was outlined by an airborne magnetometer-electromagnetic survey near acid Tertiary rocks. Follow-up work indicated a geochemical anomaly associated with a ground magnetic complex.

Work done: Ground magnetometer survey, 6 line-miles; and geochemical soil sample survey, 300 samples covering Jeanie 1 to 30.

Reference: Assessment Report 2492.

TOPLEY

TOTEM, BABINE (No. 61, Fig. C)

Location: Lat. 54°44–48′ Long. 126°05–12′ (93L/9E)
Between 2,300 and 3,300 feet elevation, on the west shore of Babine Lake, 1 mile south of Topley Landing.

Claims: BABINE 1 to 12, 63, 64, 67 to 100; TOTEM 17 to 64, 67, 68; TOTEM 1 Fraction.

Access: By road from Topley Landing, 1 to 3 miles.

Owner: TRO-BUTTLE EXPLORATION LIMITED, 848 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Topley intrusives including granodiorites and granites are overlain by volcanics of the Hazelton and Tachek Groups. Much of the property is covered by glacial drift.

Work done: Geochemical soil survey, 680 samples.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 117; Assessment Report 2727.

TACHI (No. 108, Fig. C)

Location: Lat. 54°45′ Long. 126°11′ (93L/9E, 16E)

Four miles south of Topley Landing, on Tachek Creek, at an elevation of 3,000 feet.

Claims: TACHI 1 to 100, 117 to 138, 140 to 146, 148 to 150; TACHEK 101 to 110; MET 1 to 32; TACHI 1 to 7 Fractions.

Access: By road from Topley, 20 miles.

Operator: TASEKO MINES LIMITED, 248 Second Avenue, Kamloops.

Metals: Copper, molybdenum.

Description: Chalcopyrite and molybdenite occur in fractures in dykes of quartz-biotite feldspar porphyry and in Topley granitic rocks.

Work done: Three diamond-drill holes, totalling 1,000 feet, were completed.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 115–117.

SUMMIT (No. 59, Fig. C)

Location: Lat. 54°36′ Long. 126°19′ (93L/9W)

Between Redtop and Tachek Creeks, 7 miles due north of Topley.

Claims: SUMMIT 1 to 49.

Access: By road from Topley, 8 miles.

Owner: SUMMIT OILS LIMITED, 1110, 540 Fifth Avenue SW., Calgary 1, Alta.

Work done: Magnetometer survey, 20.5 line-miles; induced polarization survey, 15 line-miles.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 119; Assessment Report 2293.

SUSAN, HELEN, DANA, DIANE (No. 34, Fig. C)

Location: Lat. 54°34-36′ Long. 126°27′ (93L/9W)

Near Johnny David Creek, a tributary of the Bulkley River, 60 miles east of Smithers and 4 miles north of Perow.

Claims: SUSAN 1 to 30, HELEN 1 to 23, DANA 1 to 14, DIANE 1 to 4.

Access: North by gravel road from Highway 16, 1 mile east of Perow.

Operator: TAGUS SYNDICATE, 805, 850 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Work done: Geochemical, biochemical, induced polarization, electromagnetic, and magnetometer surveys (done in 1969).

Reference: Assessment Report 2738.

BLACK MOUNTAIN (No. 116, Fig. C)

LOCATION: Lat. 54°36′ Long. 126°30′ (93L/9W)
Between 3,000 and 4,000 feet elevation, 7 miles north of Perow and Highway 16.

CLAIMS: BLACK MOUNTAIN 1 to 6; CU 1 to 4; BINGO 1 to 20; TINKER 1, 2; HOPE 1 to 14; FONDA 1, 2; SRF 1 to 16; FRAN 10 to 17; TIME 1 to 6.

ACCESS: From Perow by road, 6 to 8 miles.

OWNER: KEY POINT MINES CO. LTD., Box 1503, Prince George.

METALS: Copper, silver.

DESCRIPTION: Chalcopyrite and bornite occur in volcanic rocks.

WORK DONE: Trenching with a D-7 Caterpillar tractor on various areas of new ground and old trenches on Black Mountain claims and SRF group.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 120, 121.

TELKWA

DEL SANTO (No. 37, Fig. C)

LOCATION: Lat. 54°39′ Long. 126°42′ (93L/10E)
Between 3,500 and 4,000 feet elevation, about 4½ miles north of McQuarrie Lake and 18 miles north of Houston.

CLAIMS: DEL SANTO 1 to 32.

ACCESS: By road from Quick on Highway 16, 10 miles.

OPERATOR: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METALS: Copper, zinc.

DESCRIPTION: Tightly folded alternating volcanics and schistose sediments, massive sphalerite, and chalcopyrite lenses in fold noses.

WORK DONE: Surface diamond drilling, three holes totalling 130 feet on Del Santo 1.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 120; Assessment Report 2238.

GROUSE (No. 117, Fig. C) By N. C. Carter

LOCATION: Lat. 54°34′ Long. 126°43′ (93L/10E)
On the north end of Grouse Mountain.

CLAIMS: Thirty-nine, including the GROUSE 1 to 16, 18, DOME 1 to 4, SMITHERS 1 to 5, CHIEF 1 to 4, SILVER TIP 1 to 4, EAST LODE 1 to 4, DRAGON 1.

ACCESS: By 3 miles of gravel road leading off Highway 16 from a point 15 miles north of Houston.

OWNERS: A. L'ORSA (Grouse), M. CHAPMAN and C. DELAGE (Dome, Smithers, Dragon, Chief, Silver Tip), M. CHAPMAN (East Lode), all of Smithers.

METALS: Copper, zinc.

DESCRIPTION:

The Grouse claims cover the top of Grouse Mountain and were located around nine Crown-granted Copper Crown claims (Lots 6284, 6471 to 6477, 7254) owned by Copper Ridge Mines Ltd.

Copper-zinc showings are situated around three small lakes at the top of the mountain and occur as breccia fillings in a light-green fossiliferous tuff sequence. These rocks, which display sedimentary features, include fine-grained crystal tuffs, lapilli tuffs, and coarser tuff breccias. Some horizons are notably fossiliferous, containing well-preserved belemnites and ammonites of Lower Jurassic age. This sequence, which strikes approximately east-northeast and is gently dipping, apparently overlies red tuffs and breccias which occur on the north end of Grouse Mountain. The green tuffs in turn are overlain by massive andesites to the south.

The volcanic rocks are intruded by dykes and small stocks of monzonite porphyry. The dykes are generally 200 feet wide and strike northwesterly with moderate dips to southwest. Three varieties of the intrusives exist, the most prominent being a bladed feldspar porphyry in which phenocrysts of plagioclase (oligoclase-andesine) may be 3 centimetres long. The phenocrysts, which are oriented in subparallel fashion, are rimmed by sericite and set in a fine-grained matrix of plagioclase, potash feldspar, biotite, and hornblende. A finer-grained porphyritic variety contains randomly oriented 5 to 10-millimetre euhedral phenocrysts. Dykes and small stocks of an equigranular variety, fine-grained monzonite, were noted also.

Mineralization consists of fine-grained sphalerite and chalcopyrite as breccia fillings in several east-northeast trending zones crudely parallel to the stratification of the green fossiliferous tuff sequence. The mineralized zones are known from north to south as the Rainstorm-Hidden Treasure zone, the Ruby-Copper Crown zone, and the Schorn and Lakeview zones. All but the Rainstorm-Hidden Treasure zone are situated on the Crown-granted claims. The Ruby-Copper Crown zone has undergone the most development work, having been opened up by two adit levels and a shaft, plus considerable exploration drilling from the underground workings. Mineralogically, all these zones are similar, with the ratio of sphalerite to chalcopyrite being about 8 to 1. Some banding was noted in the massive sulphide ore from the Ruby zone.

The monzonite porphyry dykes are of postmineral age, with definite crosscutting relationships being observed at the Ruby and Schorn zones. Some lamprophyre dykes in the Ruby zone have also been reported.

The Grouse claims include the old Last Chance showing on the north slope of Grouse Mountain at an elevation of 4,500 feet. An adit was driven southwesterly in the 1930's on a 3 to 6-inch-wide quartz-tetrahedrite vein which contains silver and gold values.

WORK DONE: Geological mapping of the entire claim block and trenching on the Rainstorm-Hidden Treasure and Last Chance zones.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1925, p. 141; 1926, pp. 135, 136; 1928, pp. 169, 170; 1937, pp. C 11, C 12; 1951, pp. 113–117; *Geol. Surv., Canada,* Sum. Rept., 1915, pp. 65–67; Assessment Report 726.

LAVA (No. 38, Fig. C)

LOCATION: Lat. 54°30′ Long. 127°06′ (93L/11E)
At approximately 5,000 feet elevation, 12 miles south of Telkwa.

CLAIMS: LAVA, totalling 48.

ACCESS: By helicopter from Smithers, 20 miles.

OWNER: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum, silver.

DESCRIPTION: Near flat-lying volcanics intruded by granodiorite and diorite dykes and plugs; largest plug contains disseminated chalcopyrite with molybdenite on fractures.

WORK DONE: Surface diamond drilling, two holes totalling 155 feet on Lava 57.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 86; *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 129, 130.

HB, AJ (HUNTER) (No. 47, Fig. C)

Location: Lat. 54°31′ Long. 127°10′ (93L/11E)
Hunter Basin in the Telkwa Range, between elevations of 5,500 and 7,000 feet.

Claims: HB, AJ, totalling 48.

Access: From Telkwa by truck, 16 miles.

Owner: HUNTER BASIN MINES LTD., 848 West Hastings Street, Vancouver 1.

Metals: Copper, silver.

Description: Disseminations and fissure vein fillings of chalcopyrite and bornite in Hazelton volcanics.

Work done: Topography mapped; surface geological mapping, 1 inch equals 500 feet on HB and AJ claims; underground geological mapping, 1 inch equals 20 feet on HB claims; electromagnetic survey, 4 line-miles covering HB claims; geochemical stream silt and soil survey, approximately 200 samples on HB claims; surface diamond drilling, four holes totalling 1,601 feet on HB claims.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 86.

JANET, STOCK, LORNE (COPPER QUEEN) (No. 57, Fig. C)

Location: Lat. 54°41′ Long. 127°28′ (93L/11W)
At approximately 5,300 feet elevation, near the headwaters of Winfield Creek, 17 miles west of Telkwa.

Claims: JANET 1, STOCK 1 to 3, LORNE 1 to 10, LARRY 1 to 10, PREMIER 1 to 10, KEN 1 to 8, DON 1 to 8, TABLE 1 to 12, SADDLE 1 to 8, MONTY 1 to 16.

Access: From Telkwa by road, 36 miles.

Owner: COPPER QUEEN EXPLORATIONS LTD., 418, 837 West Hastings Street, Vancouver 1.

Metals: Copper, silver.

Description: A porphyry intrusive cuts Hazelton fragmental rocks.

Work done: Trenching, 2,000 feet on Table 3, 4, and 6, and Janet; stripping, about 2 acres on Table 3 and 4; surface diamond drilling, five holes totalling 962 feet on Table 3 and 4, and Janet.

TELKWA PASS

ZAP (No. 84, Fig. C)

Location: Lat. 54°34′ Long. 127°42′ (93L/12E)
Surrounding Top Lake in the Telkwa Pass, 25 miles southwest of Smithers, at an elevation of 2,500 to 5,000 feet.

Claims: Two ZAP groups, including 48 claims.

Access: By helicopter from Smithers, a distance of 25 miles.

Operator: COLORADO CORPORATION, c/o Donaldson Securities Ltd., 535 Thurlow Street, Vancouver 5.

Metals: Copper, iron, silver, gold.

Description: Chalcopyrite, pyrite, magnetite, chalcocite, and some specular hematite occur in northeasterly trending fault zones.

Work done: Magnetometer and soil geochemistry surveys were performed on the claim groups.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 80; Assessment Reports 2129, 2687.

ALLIE (No. 45, Fig. C)

LOCATION: Lat. 54°34′ Long. 127°49′ (93L/12W)
Between elevations of 4,000 and 5,000 feet, north of Limonite Creek, Telkwa Pass area.

CLAIMS: ALLIE 1 to 44.

ACCESS: By helicopter from Smithers, 31 miles.

OWNER: Evergreen Explorations Ltd.

OPERATOR: PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Copper and molybdenum induced polarization anomaly on flank of biotite feldspar porphyry.

WORK DONE: Surface diamond drilling, two holes totalling 1,253 feet on Allie 1 and 12.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 79; Assessment Report 2413.

LOUISE LAKE

LOU (No. 20, Fig. C)

LOCATION: Lat. 54°52′ Long. 127°40′ (93L/13E)
At approximately 3,300 feet elevation, immediately west of Louise Lake.

CLAIMS: LOU 1 to 63, 71 to 178.

ACCESS: By air from Smithers, 20 miles.

OWNER: Leitch Mines Limited.

OPERATOR: CANADIAN SUPERIOR EXPLORATION LIMITED, Box 100, Smithers.

METALS: Copper, molybdenum.

DESCRIPTION: A complex of acid pyroclastic volcanic rocks and feldspar porphyry intrusions show strong argillic alteration. West of Louise Lake, where the alteration is most intense, a quartz and pyrite stockwork is mineralized with tennantite, minor amounts of chalcopyrite and molybdenite, and rare amounts of other base metals.

WORK DONE: Surface geological mapping, 1 inch equals 800 feet on all claims; induced polarization survey, 16 line-miles covering 54 claims; geochemical soil survey, 673 samples covering 54 claims; surface diamond drilling, 17 holes totalling 6,632 feet on Lou 3 to 7, 20, 92, and 111.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 80; Map 69-1; Assessment Reports 1999, 2278, 2697, 2698.

JAN, WINDY (No. 19, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°53′ Long. 127°52′ (93L/13W)
Between elevations of 4,000 and 6,000 feet on the north side of an 8,100-foot mountain at the head of Kitsuns Creek, about 10 miles west of Louise Lake.

CLAIMS: JAN 1 to 33, WINDY 1 to 6.

ACCESS: Thirty miles west from Smithers, by helicopter.

OWNER: Leitch Mines Limited.

OPERATOR: PECHINEY DEVELOPMENT LIMITED, 619, 744 West Hastings Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION:

Copper and molybdenum mineralization is associated with a dyke-like body of hornblende feldspar porphyry which measures one-half by 1 mile. The porphyry which is bounded by north-south faults trends north-northeasterly and has been emplaced between Hazelton volcanic rocks on the south and Bowser sedimentary rocks to the north. Three small porphyry plugs cut volcanic rocks south of the main intrusive.

Varying degrees of hydrothermal alteration are present and the margins of the porphyry body and adjacent volcanic rocks are intensely pyritized so that a prominent gossan encompasses an area of about 1 by 1½ miles (*see* Ann. Rept., 1968, pp. 109–111).

Near the eastern end of the main porphyry mass, a trench cuts across a mineralized zone in which chalcopyrite and pyrite occur in dry fractures of random orientation. Molybdenite occurs sporadically in one-eighth to one-quarter-inch-wide milky quartz veinlets, and some veinlets of magnetite are also present. Fracture density in the area of the trench varies between 6 and 12 fractures or veinlets per foot. Here also, the porphyry displays varying degrees of sericite, kaolin, potash feldspar, and carbonate alteration.

Seven holes were drilled, including three along a line westerly from the trench area and four holes north and south of the trench.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet on Windy 1 to 6 claims; surface diamond drilling, seven holes totalling 2,595 feet on Windy 1 to 4 claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 84; 1968, pp. 109–111; Assessment Report 698; *B.C. Dept. of Mines & Pet. Res.*, Map 69-1.

SMITHERS

REISETER (No. 73, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°55′ Long. 127°10′ (93L/14E)
On the south side of Reiseter Creek, 2 miles east of the Bulkley River.

CLAIMS: REISETER, totalling 12.

ACCESS: By four-wheel-drive road leading off the Driftwood Creek road along the east side of the Bulkley River.

OWNER: A. MESICH, Box 759, Smithers.

METALS: Antimony (copper, molybdenum) (*see* Table 1 for production).

DESCRIPTION:

The claims are underlain by Bowser argillaceous siltstones. At 3,000 feet elevation, the siltstones are intruded by a swarm of leucocratic quartz feldspar porphyry dykes of quartz monzonite composition. The dykes are 15 to 20 feet wide and have caused selective biotite hornfelsing of black siltstones. Some molybdenite and minor chalcopyrite occur on dry fractures and in quartz veinlets in both the porphyry dykes and hornfels. The widespread distribution of the hornfels zone suggests the presence of a more extensive body than the dykes exposed on surface.

At a lower elevation than the molybdenum-copper zone and northwest of it, there are seven known parallel vein structures which occupy north-northeast-striking, moderately east-dipping shear zones. The majority of the veins range in width from 3 to 10 inches and metallic minerals include varying amounts of stibnite with subordinate sphalerite, galena, and minor chalcopyrite. Half-inch-size angular rock fragments are commonly cemented by sulphides and quartz. The veins characteristically have sharp walls, usually 1 inch of gouge material separates the vein from bleached light-grey siltstones.

The number one vein, between elevations of 2,500 and 2,600 feet, has undergone the most development. The vein is exposed in a series of pits and trenches over a strike length of 475 feet, and varies in width from 6 to 24 inches. In the northernmost pit, the vein is 10 inches wide and is bounded by 1-inch gouge zones. Stibnite occurs mainly as coarse-grained tabular crystals with finer-grained material occurring erratically in the hangingwall. Halfway along the exposed vein length, elongate bleached siltstone fragments about 1 inch long and aligned parallel to the trend of the vein are contained in a matrix of massive fine-grained stibnite. A grab sample from the vein at this point assayed 4 per cent antimony and a trace of gold. The lowest cut exposes a 24-inch width of vein material, including lenses of country rock. A chip sample across this width assayed 2.2 per cent antimony and a trace of gold.

WORK DONE: Stripping and open cutting on several vein structures. Twenty-one tons of sorted high-grade vein material from number one vein was shipped to the National Lead smelter in Laredo, Texas.

GLACIER GULCH (No. 17, Fig. C)

LOCATION: Lat. 54°49′ Long. 127°18′ (93L/14W)
Between 3,000 and 4,000 feet elevation, in Glacier Gulch on the east side of Hudson Bay Mountain, 5 miles northwest of Smithers.

CLAIMS: In excess of 200.

ACCESS: By road from Smithers, 5 miles.

OWNER: Climax Molybdenum Corporation of British Columbia Limited.

OPERATOR: AMERICAN METAL CLIMAX INC., Mines Park, Golden, Colo.

METALS: Molybdenum, tungsten.

DESCRIPTION: Molybdenite mineralization in a stockwork-type deposit associated with granodiorite.

WORK DONE: Claim survey; underground geological mapping, 1 inch equals 100 feet; geochemical trace analysis survey, 1,000 samples; underground work, excavation of six diamond-drill stations (totalling 1,591 cubic yards) and the advancement of the 150 South crosscut for 200 feet; approximately 25 underground diamond-drill holes totalling more than 20,000 feet. A diesel-driven electric generator was installed and connected to the service installed by the Canadian Mine Services.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, pp. 86–90; 1967, p. 90; 1968, p. 120; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 85; Assessment Reports 1730, 2245.

GUY (No. 65, Fig. C)

LOCATION: Lat. 54°47′ Long. 127°26′ (93L/14W)
Adjoining Dennis Lake to the northwest, 11 miles due west of Smithers.

CLAIMS: GUY 1 to 35.

ACCESS: By road from Smithers, 14 miles.

OWNER: DELBROOK MINES LIMITED, 4470 Glencanyon Drive, North Vancouver.

WORK DONE: Magnetometer survey, 4 line-miles; geochemical soil survey, 109 samples.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 81; Assessment Report 2294.

CRONIN MINE (No. 122, Fig. C)

By W. G. Clarke

LOCATION: Lat. 54°55.3′ Long. 126°48.5′ (93L/15W)
On the east slope of Mount Cronin.

CLAIMS: SUNRISE No. 7 Crown-granted mineral claim and seven claims held under option.

ACCESS: Thirty miles by road from Smithers.

OWNER: New Cronin Babine Mines Limited.

OPERATOR: KINDRAT MINES LTD., Box 1057, Smithers.

METALS: Gold, silver, lead, zinc, cadmium (*see* Table 1 for production).

WORK DONE: The mine was reopened on June 1 and closed on November 12. Two thousand tons of ore was broken in the No. 2 vein above 4,775 feet elevation; of this, 1,746 tons was milled. Three weeks were spent on geological mapping and soil-sampling. The ball mill was relined. Two men were employed.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 100.

MERT (No. 63, Fig. C)

LOCATION: Lat. 54°49′ Long. 126°50′ (93L/15W)
Between 3,200 and 4,500 feet elevation on the southeast slope of Astlais Mountain, 14 miles east-northeast of Smithers.

CLAIMS: MERT 7 to 12, 15 to 20, 23 to 37.

ACCESS: By road from Smithers, approximately 18 miles.

OWNER: TRO-BUTTLE EXPLORATION LIMITED, 848 West Hastings Street, Vancouver 1.

DESCRIPTION: Northeasterly striking acidic to basic volcanic and associated pyroclastic rocks of the Hazelton Group occupy the southern part of property, and sedimentary rocks of the same group underlie the northern claims. The contact area is intruded by a small quartz diorite stock.

WORK DONE: Magnetometer survey, 40 line-miles covering all claims.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 119; Assessment Reports 1017, 1143, 2527.

BIG ONION (No. 50, Fig. C)

LOCATION: Lat. 54°47′ Long. 126°54′ (93L/15W)
Along the Babine Lake road, 11½ miles east of Smithers.

CLAIMS: JACK 33 to 36; JACK 16 Fraction; RALPH 10, 12, 14; JILL 1 to 21; JILL 1, 2, 5 to 10 Fractions; BA 9, 11, 25 (Charlie group).

ACCESS: By road, 12 miles east of Smithers.

OWNER: BLUE ROCK MINING CORPORATION LTD., 1101, 510 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Argillites and quartzites with disseminated pyrite.

WORK DONE: Induced polarization, resistivity, magnetometer, electromagnetic, geological, and geochemical surveys.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1966, pp. 83–86; Assessment Reports 2752, 2753.

SUSAN, JUD, RDW (No. 48, Fig. C)

LOCATION: Lat. 54°52′ Long. 126°54′ (93L/15W)
At approximately 6,000 feet elevation, at the headwaters of Ganokwa Creek, about 12 miles northeast of Smithers.

CLAIMS: SUSAN 1 to 6, JUD 1 to 4, RDW 1 to 20.

ACCESS: From Smithers by helicopter, 12 miles.

OWNER: ROCKWELL RESOURCES LTD., 20th Floor, 1055 West Hastings Street, Vancouver 1.

METALS: Copper, silver.

DESCRIPTION: Bornite, chalcocite, and tetrahedrite occur in veins and brecciated zones. Some bleaching, epidotization, and chloritization of andesitic host rocks are noted adjacent to the veins.

WORK DONE: Trenching, 10 feet, and pack-sack drilling, two holes totalling 20 feet on Jud 1.

BABINE LAKE

KARE (No. 62, Fig. C)

LOCATION: Lat. 54°57′ Long. 126°06′ (93L/16E)
Between 2,350 and 2,450 feet elevation, on the east side of Babine Lake, south of Hawthorn Bay.

CLAIMS: KARE 1 to 72, A Fraction.

ACCESS: By boat from Topley Landing, 8 miles.

OWNER: TRO-BUTTLE EXPLORATION LIMITED, 848 West Hastings Street, Vancouver 1.

DESCRIPTION: Extensive overburden, believed to be underlain largely by volcanics of the Hazelton Group, with minor intrusives. An earlier magnetic survey suggests some of the latter may be similar to the Granisle intrusive.

WORK DONE: Induced polarization survey covering Kare 1 to 6, 19 to 26, 46, 48, and 50.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 132; Assessment Reports 951, 1256.

GRANISLE MINE (No. 90, Fig. C)

By W. G. Clarke

LOCATION: Lat. 54°56.5′ Long. 126°09.5′ (93L/16E)
On McDonald (Copper) Island, 10 miles north of Topley Landing.

CLAIMS: Thirty-one Crown-granted and 15 recorded claims on McDonald Island and 44 recorded claims on Sterrett Island and one adjoining island to the south.

ACCESS: By ferry from the townsite of Granisle, on the west side of Babine Lake, 7 miles by gravel road from Topley Landing.

OWNER: GRANISLE COPPER LIMITED, 1111 West Georgia Street, Vancouver 5.

METAL: Copper (*see* Table 1 for production).

WORK DONE:

There were no significant changes in methods or schedules. Ten 35-ton trucks were replaced by eight 50-ton trucks for haulage. A tractor-trailer truck was purchased for hauling concentrates from the mill to the West Landing. A new heavy-equipment repair shop was completed. The tailings and reclaim water-lines were relocated. Five new houses were built in the townsite. There were 163 employees.

A metallic neutral conductor was installed from the plant-site to tie into the British Columbia Hydro and Power Authority neutral on the Mainland. The conductor is No. 2 A.C.S.R. on the overhead line and No. 4 copper submerged between

Plate Xa.—Granisle mine pit looking southwest, summer 1970.

Plate Xb.—Kitsuns Creek, Jan property exploration camp.

the islands and ditched at the shore sections. Between the islands and the Mainland the power cable armouring serves as a neutral.

Three new submarine cables have been installed from the Mainland to the small island.

Three 25,000–600-volt transformers mounted on a three-pole structure were installed for a new water-reclaim system.

Two flotation cells and a tailings pump were added to the mill equipment. These additions, together with approximately 30 horsepower in small motors which were installed, increase the mill connected load by 165 horsepower.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, pp. 97–99; 1967, pp. 104, 105; 1968, pp. 132, 133; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 114, 115.

KETZA, JEN, RUM (No. 15, Fig. C)

LOCATION: Lat. 54°56′ Long. 126°12′ (93L/16E)
Newman Peninsula on Babine Lake.

CLAIMS: KETZA, JEN, RUM, 47 in all.

ACCESS: By boat from Topley Landing, 10 miles.

OWNER: TEXACAL RESOURCES LTD., 403, 717 West Pender Street, Vancouver 1.

DESCRIPTION: Area of the claims is underlain by acid and intermediate fragmental rocks and hornblende feldspar porphyry sills.

WORK DONE: Induced polarization survey, 20 line-miles on Ketza, Jen, and Rum claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1965, p. 103; Assessment Reports 1073, 2646.

TOP, CANOVA (No. 118, Fig. C)

LOCATION: Lat. 54°51′ Long. 126°15′ (93L/16E)
At approximately 3,000 feet elevation, in the Babine Lake area.

CLAIMS: One hundred and sixty-three TOP, 40 CANOVA.

ACCESS: From Topley by road, 30 miles.

OWNER: NITTETSU MINING CO. LTD., 404, 470 Granville Street, Vancouver 2.

WORK DONE: Reconnaissance induced polarization survey, 19.2 line-miles covering the Top claims; geochemical soil survey, 715 samples covering the Top claims and 151 samples covering the Canova claims; road construction, 3.5 miles (about centre of claim group).

CORTINA, COUGER (No. 119, Fig. C)

LOCATION: Lat. 54°48′ Long. 126°15′ (93L/16E)
At approximately 3,000 feet elevation, in the Babine Lake area.

CLAIMS: Forty-five CORTINA, 40 COUGER.

ACCESS: From Topley by road, 25 miles.

OWNER: NITTETSU MINING CO. LTD., 404, 470 Granville Street, Vancouver 2.

WORK DONE: Reconnaissance induced polarization survey, 8.6 line-miles covering the Cortina claims and 9.4 line-miles covering the Couger claims; geochemical soil survey, 407 samples covering the Cortina claims and 205 samples covering the Couger claims; road construction, 1.5 miles on the Cortina claims.

DEL, LOU (No. 29, Fig. C)

LOCATION: Lat. 54°55–56′ Long. 126°15–18′ (93L/16E, 16W)
Between 2,300 and 2,600 feet elevation, 5½ miles southwest of Granisle mine on Babine Lake.

CLAIMS: DEL 1 to 54, LOU 1 to 8.

ACCESS: By helicopter from Granisle townsite, 5½ miles.

OWNER: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METALS: Copper, zinc, silver(?).

DESCRIPTION: Sequence of volcanic breccias and tuffs passing into sedimentary quartzites and limestone.

WORK DONE: Geochemical survey, 854 samples covering Del 7, 8, 15 to 20.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1967, p. 102; Assessment Reports 1250, 1724, 1725.

BADGE (No. 28, Fig. C)

LOCATION: Lat. 54°50′ Long. 126°20′ (93L/16E, 16W)
At approximately 2,500 feet elevation, on north shore of Fulton Lake, near east end.

CLAIMS: BADGE 5 to 12.

ACCESS: By road and water from Topley Landing, 7 miles.

OWNER: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

DESCRIPTION: Diorite with magnetite in drill holes.

WORK DONE: Surface diamond drilling, two holes totalling 749 feet on Badge 5 and 9.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 115.

O (No. 30, Fig. C)

LOCATION: Lat. 54°50′ Long. 126°15′ (93L/16W)
At approximately 2,900 feet elevation, 5 miles west of Babine Lake and 3 miles north of Fulton Lake.

CLAIMS: O 1 to 40.

ACCESS: By road from Topley Landing, 7 miles.

OWNER: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Area underlain by volcanic flows, latite porphyry and andesite, and andesitic tuff; chalcopyrite in fine epidote-filled fractures.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on O 6 and 8; geochemical survey, 458 samples covering O 3 to 8; surface diamond drilling, three holes totalling 580 feet on O 6 and 8.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1967, p. 102; Assessment Reports 1160, 1168, 1250, 2457.

ALP (No. 85, Fig. C)

LOCATION: Lat. 54°49′ Long. 126°22′ (93L/16W)
Ten miles west of Topley Landing, south of Fulton Lake.

CLAIMS: ALP, totalling 379.

ACCESS: By four-wheel-drive vehicle from Topley, about 25 miles.

Owner: NIPPON MINING OF CANADA LTD., 607, 475 Howe Street, Vancouver 1.

Metal: Copper.

Description: Minor chalcopyrite occurs as disseminations in Hazelton volcanic rocks.

Work done: Reconnaissance surface geological mapping and geochemical soil survey, 1,032 samples covering all claims.

WB (COLE) (No. 60, Fig. C)

Location: Lat. 54°56′ Long. 126°27′ (93L/16W)
Three miles due east of Tanglechain Lake, 30 miles northeast of Smithers.

Claims: WB 1 to 32.

Access: From Smithers by road for 35 miles and helicopter for 5 miles.

Owner: SUMMIT OILS LIMITED, 1110, 540 Fifth Avenue SW., Calgary, Alta.

Work done: Induced polarization survey, 4.5 line-miles.

Reference: Assessment Report 2295.

DOROTHY (No. 40, Fig. C)

Location: Lat. 55°14′ Long. 126°10′ (93M/1E)
At approximately 2,500 feet elevation, 3 miles east of the southeast end of Nakinilerak Lake, 51 miles northeast of Smithers.

Claims: DOROTHY, more than 300.

Access: By float plane from Smithers, 50 miles.

Owners: Ducanex Resources Limited and Twin Peak Mines Ltd.

Operator: DUCANEX RESOURCES LIMITED, 2306, 401 Bay Street, Toronto 103, Ont.

Metals: Copper, molybdenum.

Description: Chalcopyrite, minor bornite, and molybdenite in a biotite-feldspar porphyry and adjacent hornfels.

Work done: Surface geological mapping, 1 inch equals 400 feet on Dorothy 41, 42, 47, 48, 501 to 504, and 530 to 536; induced polarization, magnetometer, and electromagnetic surveys, 18 line-miles covering the same claims, plus Dorothy 1 to 20, 577 to 581, and 550 to 562; geochemical soil survey, 300 samples covering same claims; road construction, 6 miles (north from MacDougall Lake); surface diamond drilling, four holes.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 95 (*see* Haut).

HAUT (No. 51, Fig. C)

Location: Lat. 55°07′ Long. 126°03′ (93M/1E)
At approximately 3,000 feet elevation, 60 miles northeast of Smithers and 3 miles northwest of Natowite Lake.

Claims: HAUT, totalling 204.

Access: From Smithers by fixed-wing aircraft, 60 miles.

Owner: AMOCO CANADA PETROLEUM CO. LTD., 2160, 1055 West Hastings Street, Vancouver 1.

Work done: Induced polarization survey, 21 line-miles covering Haut 30 to 153; ground magnetometer survey, 31 line-miles covering Haut 1 to 168.

BEN (No. 11, Fig. C)

Location: Lat. 55°03–04′ Long. 126°11–15′ (93M/1E)
Situated immediately north of Newman Peninsula, Babine Lake.

Claims: BEN 1 to 20, 23 to 42.

Access: By boat from Smithers Landing, 15 miles.

Owner: TORWEST RESOURCES (1962) LTD., 812, 1177 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Much of the property is drift covered. Ridges 2 miles east of Babine Lake are underlain principally by intermediate fragmental volcanic rocks, with some interbedded sediments.

Work done: Geochemical survey, 551 samples covering all the claims.

References: Assessment Report 2524; *B.C. Dept. of Mines & Pet. Res.*, Map 69-1.

BELL MINE (NEWMAN) (No. 89, Fig. C)

By W. G. Clarke

Location: Lat. 55°00′ Long. 126°14′ (93M/1E, 93L/16E)
At the north end of Newman Peninsula, on Babine Lake.

Claims: NEWMAN, LINDA, LAD, and other groups for a total of 181 claims.

Access: From Highway 16 by gravel road, via Topley Landing, 42 miles to a landing on the west shore of Babine Lake, 8 miles north of Granisle, then by barge or launch to Newman Peninsula.

Owner: NORANDA MINES, LIMITED, Bell Copper Division, Box 2000, Granisle.

Metal: Copper.

Work done: About 8½ miles of access road was built and excavations were made for the east and west dock approaches. A bubbler system was installed across Babine Lake. Half the excavation at the plant-site was completed. The administration and service building was erected and sheathed. Overburden stripped, 1,014,500 cubic yards; waste rock stripped, 906,000 cubic yards. A temporary power supply was installed, consisting of four diesel-driven generating units, as follows: Two of 250-kva. each; one of 200-kva.; one of 100-kva.

References: *Minister of Mines, B.C.*, Ann. Rept., 1965, pp. 99–102; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 114 (*see* Newman).

MORRISON (No. 53, Fig. C)

Location: Lat. 55°12′ Long. 126°18′ (93M/1W)
At approximately 2,600 feet elevation, at the south end of Morrison Lake, some 44 miles northeast of Smithers.

Claims: ALVA 1, 2; FRANCES 25, 27; DYKE 1 to 4; DULL AXE 1, 2; SHE 13, 14; ELLEN 1 to 16; 3 Fraction; DYKE 5 to 7 Fractions.

Access: From Smithers by aircraft, 44 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Chalcopyrite, bornite, minor molybdenite, and sphalerite are disseminated in biotite feldspar porphyry and adjacent siltstones. Alteration consists of biotitization, silicification, kaolinization, pyritization, and chloritization.

Work done: Surface diamond drilling, 19 holes totalling 9,888 feet on Ellen claims.

References: *Minister of Mines, B.C.*, Ann. Repts., 1965, p. 104; 1966, pp. 101, 102; 1967, pp. 106, 107; 1968, p. 135.

HILL (No. 56, Fig. C)

Location: Lat. 55°05′ Long. 126°23′ (93M/1W)
Between 2,322 and 5,158 feet elevation on Old Fort Mountain, 6 miles east of Smithers Landing.

Claims: HILL 1 to 66, 1 to 27 Fractions.

Access: From Smithers Landing by boat, 4 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Claim group underlain by a succession of interbedded sedimentary and volcanic rocks intruded by small bodies of quartz diorite and hornblende-biotite feldspar porphyry. Local hornfelsing, biotitization, and pyritization.

Work done: Surface geological mapping, 1 inch equals 400 feet; electromagnetic survey, 17.8 line-miles; magnetic survey, 19 line-miles; geochemical soil survey, 364 samples covering Hill 1 to 56 and 1 to 24 Fractions.

References: *Minister of Mines, B.C.*, Ann. Rept., 1966, pp. 92, 93; Assessment Report 2608.

SKIP (No. 55, Fig. C)

Location: Lat. 55°12′ Long. 126°33′ (93M/2E)
At approximately 2,500 feet elevation, on the east side of the northwest arm of Babine Lake, 8 miles north of Smithers Landing.

Claims: SKIP 1 to 24, 1 to 10 Fractions.

Access: From Smithers Landing by boat, 8 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Feldspar porphyry and quartz monzonite intrude Hazelton sedimentary rocks within the claim group. Hornfelsing and pyritization are present but weak.

Work done: Surface geological mapping, 1 inch equals 400 feet; electromagnetic survey, 11 line-miles; magnetic survey, 14.5 line-miles; geochemical soil survey, 224 samples covering Skip 1 to 24 and 1 to 10 Fractions.

BIG JOE (No. 27, Fig. C)

Location: Lat. 55°02′ Long. 126°33′ (93M/2E)
At approximately 2,600 feet elevation, near Smithers Landing.

Claims: BIG JOE 1 to 8, EJS 1 to 12.

Access: By road from Smithers Landing, 4 miles.

Operator: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

Metal: Copper.

DESCRIPTION: Small amounts of chalcopyrite in and adjoining fractures in Mesozoic volcanics.

WORK DONE: Magnetometer survey, 7 line-miles covering Big Joe 1 to 8; geochemical soil survey, 420 samples covering Big Joe 1 to 8; trenching, 700 feet on Big Joe 1 and 8.

HAZELTON

MARY (No. 43, Fig. C)

LOCATION: Lat. 55°11′ Long. 127°13′ (93M/3E)
At approximately 5,000 feet elevation on Blunt Mountain, at the head of Luno Creek, 29 miles north of Smithers.

CLAIMS: MARY 1 to 38.

ACCESS: By helicopter from Smithers, 29 miles.

OWNER: TWIN PEAK MINES LTD., 202, 560 West Broadway, Vancouver 9.

METALS: Molybdenum, copper.

DESCRIPTION: Chalcopyrite and molybdenite are associated with widespread quartz veinlets and silicification in a Tertiary acid intrusive.

WORK DONE: Airborne magnetometer and electromagnetic survey, 100 line-miles covering Mary 1 to 38.

REFERENCE: Assessment Report 2529.

ORBI (No. 70, Fig. C)

LOCATION: Lat. 55°10′ Long. 127°22′ (93M/3E, 3W)
At approximately 1,200 feet elevation, straddling the Bulkley River, 12 miles southeast of New Hazelton.

CLAIMS: ORBI 9 to 19, 21 to 28, 58, 60, 62, 64, 83 to 90, 2001; DIANN 1 to 8, 14, 16, 18, 20.

ACCESS: From Highway 16 by four-wheel-drive vehicle, approximately 12 miles.

OWNER: UTAH CONSTRUCTION & MINING CO., 412, 510 West Hastings Street, Vancouver 2.

METALS: Lead, zinc, copper.

DESCRIPTION: An argillic and siliceously altered rhyolite is cut by mineralized breccia zones. Pyrite is present up to 20 per cent when associated with calcite.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on Orbi 13, 14 to 18, 62 to 64, 83 to 87, and 89; induced polarization and electromagnetic surveys, 10 line-miles covering Orbi 15 to 18, 25, 27, 83 to 87, and 89; induced polarization survey, 1.5 line-miles covering Orbi 15 to 18, 83, and 84; surface diamond drilling, two holes totalling 1,058 feet on Orbi 17 and 18.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 85; 1968, p. 112; Assessment Report 2463.

TETRA (MORICETOWN SILVER) (No. 16, Fig. C)

LOCATION: Lat. 55°02′ Long. 127°17.5′ (93M/3W)
At approximately 2,000 feet elevation, on Causqua Creek, 12 miles north of Smithers.

CLAIMS: TETRA 1 to 10, 13 to 40; BULKLEY 1 to 12; HARRY 1, 2; TITAN 1 to 14; HBG 1 to 6; ROS 1 to 4 and 5 Fraction; 77 in all.

ACCESS: By road from Highway 16, 5 miles.

OPERATOR: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

Metals: Silver, lead, zinc.

Description: *See* Annual Report of the Minister of Mines and Petroleum Resources for 1968, pages 124 to 126.

Work done: Geochemical survey consisting of 2,200 soil samples; trenching totalling 8,000 feet on Titan 2, 4, 6, and 8, Harry 1, and Tetra 18 claims.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 124–126; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 99, 100.

SILVER TIP (SULTANA) (No. 69, Fig. C)

Location: Lat. 55°06′ Long. 127°32′ (93M/4E)
At approximately 5,200 feet elevation, at the headwaters of the south fork of Boulder Creek, 13 miles by road from Highway 16 and 10 air-miles northwest of Moricetown.

Claims: SILVER TIP 1 to 34, S 1 to 105, E 1 to 32.

Access: From Highway 16, 6 miles north of Moricetown, by four-wheel-drive vehicle, 13 miles.

Owner: Sultana Silver Mines Limited.

Operator: UTAH CONSTRUCTION & MINING CO., 412, 510 West Hastings Street, Vancouver 2.

Metals: Copper, molybdenum.

Description: Pyrite, chalcopyrite, and molybdenite occur as disseminations and fracture-fillings in granodiorite of the Rocher Deboule stock. A silver vein stockwork was formerly of principal interest. Minor argillic alteration is present.

Work done: Surface geological mapping, 1 inch equals 200 feet on Silver Tip 1 to 8; induced polarization survey, 81 line-miles covering Silver Tip 3 to 8.

References: *Minister of Mines, B.C.*, Ann. Repts., 1923, p. 107; 1967, p. 85; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 85; *B.C. Dept. of Mines*, Bull. 43, p. 68; Assessment Report 92.

LOUDEL (No. 8, Fig. C)

Location: Lat. 55°10.5′ Long. 127°42.5′ (93M/4E)
Between 1,200 and 4,000 feet in the South Hazelton area.

Claims: LOUDEL, totalling 82.

Access: By road from South Hazelton, 4½ miles.

Operator: CHAPPARAL MINES LTD., 428, 470 Granville Street, Vancouver 2.

Metals: Copper, tungsten.

Work done: Surface geological mapping; magnetometer survey, 3 line-miles; induced polarization survey, 6.4 line-miles covering Loudel 1 to 4, 12, 14, 16, and 22; stripping, 4,000 feet on Loudel 1 and 2; surface diamond drilling, four holes totalling 946 feet; percussion drilling, six holes totalling 1,040 feet on Loudel 1 and 2.

Reference: *B.C. Dept. of Mines*, Bull. 45, 1962, pp. 51, 52.

AMERICAN BOY (No. 68, Fig. C)

Location: Lat. 55°19′ Long. 127°34′ (93M/5E)
At approximately 2,900 feet elevation on the southwest slope of Nine Mile Mountain, 6 miles northeast of Hazelton.

Claims: AMERICAN BOY 1 to 6.

Access: From Hazelton by road, 6 miles.

OWNER: NORTHWESTERN MIDLAND DEVELOPMENT CO. LTD., Box 130, Hazelton.

METALS: Lead, silver, zinc.

DESCRIPTION: Three quartz veins, containing galena, sphalerite, arsenopyrite, tetrahedrite, pyrite, and chalcopyrite, cut Bowser sedimentary rocks.

WORK DONE: Trenching, 27 feet on American Boy 1 to 6.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1917, pp. 104–106.

SAL (No. 92, Fig. C)

LOCATION: Lat. 55°30′ Long. 127°35′ (93M/5E)
South of Sediesh Creek, 2 miles east of the Skeena River, between elevations of 1,700 and 4,000 feet.

CLAIMS: SAL 1 to 32.

ACCESS: By road along the east side of the Skeena River, 16 miles north of Hazelton.

OPERATOR: BRETTLAND MINES LTD., 1009, 789 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: A small plug of porphyritic granodiorite intrudes Bowser siltstones. Pyrite, chalcopyrite, and molybdenite occur in quartz veinlets in the intrusive and adjacent hornfelsed siltstones.

WORK DONE: Soil-sampling was carried out over the central part of the claim group.

REFERENCE: Assessment Report 2828.

DAISY (No. 41, Fig. C)

LOCATION: Lat. 55°18′ Long. 126°58′ (93M/6E, 7W)
At approximately 4,000 feet elevation on Netalzul Mountain, 33 miles northeast of Smithers and 25 miles east of Hazelton.

CLAIMS: DAISY 1 to 38.

ACCESS: By helicopter from Smithers, 33 miles.

OWNER: TWIN PEAK MINES LTD., 202, 560 West Broadway, Vancouver 9.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite in quartz stringers cutting granodiorite.

WORK DONE: Airborne magnetometer and electromagnetic survey, 100 line-miles covering Daisy 1 to 38.

REFERENCE: Assessment Report 2663.

MG (No. 71, Fig. C)

LOCATION: Lat. 55°16′ Long. 127°10′ (93M/6E)
Between 1,500 and 4,000 feet elevation, on the south bank of the Suskwa River, approximately 15 miles east of New Hazelton.

CLAIMS: MG 1 to 14.

ACCESS: From Smithers by helicopter, 32 miles.

OWNER: UTAH CONSTRUCTION & MINING CO., 412, 510 West Hastings Street, Vancouver 2.

METALS: Silver, zinc, lead.

DESCRIPTION: Veins containing sphalerite, galena, jamesonite, and pyrite in a gangue of quartz and siderite are found in Bowser sedimentary rocks near an intrusive diorite contact. Limonite is the only noticeable alteration.

Work done: Surface geological mapping, 1 inch equals 200 feet, and electromagnetic survey, 33 line-miles covering MG 1 to 14.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 113; Assessment Report 2495.

SUNRISE (No. 58, Fig. C)

Location: Lat. 55°21′ Long. 127°29′ (93M/6W)
Between 4,800 and 5,400 feet elevation on the north side of Nine Mile Mountain, 13 air miles northeast of Hazelton.

Claims: VAN 1 to 6, ALPHA 6 to 30, six Crown-granted claims (ETHEL, SUNSET, SUNRISE, NOONDAY, HIDDEN TREASURE, ETHEL Fraction).

Access: From Hazelton by road, 14½ miles.

Owner: SUNRISE SILVER MINES LTD., 818 Cumberland Crescent, North Vancouver.

Metals: Silver, lead, zinc, antimony, bismuth (*see* Table 1 for production).

Description: Freibergite and galena occur in fractures and fault fissures in granodiorite.

Work done: Road on north side of Nine Mile Mountain improved; trenching, 50 feet on Alpha 6.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 99.

BILL (No. 10, Fig. C)

Location: Lat. 55°21′ Long. 127°30′ (93M/6W)
At about 5,000 feet elevation on Nine Mile Mountain, approximately 13 miles northeast of Hazelton.

Claims: BILL 1 to 16.

Access: By four-wheel-drive vehicle from Hazelton, 14 miles.

Owner: FRONTIER EXPLORATION LIMITED, 642 Clark Drive, Vancouver 6.

Metals: Silver, lead.

Description: Vein deposit in greywacke.

Work done: Trenching, 200 feet on Bill 13; surface diamond drilling, one hole totalling 300 feet on Bill 15.

MORRISON LAKE

BABE (No. 54, Fig. C)

Location: Lat. 55°15′ Long. 126°30′ (93M/7E, 8W)
At approximately 3,000 feet elevation, halfway between Morrison Lake and the northwest arm of Babine Lake.

Claims: BABE 1 to 68, 1 to 24 Fractions; LUK 1 to 76, 1 to 32 Fractions; THORN 1 to 12, 1 to 5 Fractions; TOT 1 to 14, 1 to 7 Fractions.

Access: From Smithers by aircraft, road, and boat, 60 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Northwest-striking Jurassic volcanic and sedimentary rocks are intruded by quartz monzonite and hornblende biotite porphyry within the claim group.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on the Tot, Thorn, and Luk claims; electromagnetic survey, 20 line-miles and magnetic survey, 22 line-miles covering the same claims; geochemical soil survey, 251 samples covering Luk claims; surface diamond drilling, six holes totalling 1,420 feet on Babe 4, 8, 10, 21, and 1 Fraction.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 113; Assessment Reports 2150, 2151.

BABINE

MAT (No. 26, Fig. C)

LOCATION: Lat. 55°28–30′ Long. 126°45–49′ (93M/7W)
At approximately 2,500 feet elevation, 13 miles north-northwest of the village of Babine and west of the Babine River.

CLAIMS: MAT 1 to 62.

ACCESS: By helicopter from Smithers, 50 miles.

OWNER: CANADIAN SUPERIOR EXPLORATION LIMITED, Box 100, Smithers.

DESCRIPTION: Mainly sedimentary rocks consisting of interbedded mudstone, siltstone, sandstone, and conglomerate, with areas of mafic extrusives and tuffs.

WORK DONE: Surface geological mapping, 1 inch equals 2,640 feet; electromagnetic survey (Crone JEM), 29 line-miles; magnetometer survey, 37 line-miles covering Mat 1 to 62; geochemical stream sediment survey, 40 to 50 samples covering some the claims.

NAKINILERAK LAKE

DA (No. 52, Fig. C)

LOCATION: Lat. 55°18′ Long. 126°13′ (93M/8E)
Between 3,500 and 4,000 feet elevation, east of Nakinilerak Lake.

CLAIMS: DA, NAK, WENDY, BEAR, SNO, totalling 106.

ACCESS: From Smithers by aircraft, 50 miles.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Chalcopyrite and bornite occur as disseminations in matrix and as fracture-fillings in biotite feldspar porphyry and related phases. Alteration consists of pyritization, sericitization, kaolinization, and silicification.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on DA and Nak claims; surface diamond drilling, 13 holes totalling 4,323 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, pp. 95–97; 1967, p. 103; 1968, p. 131; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 112, 113; Assessment Report 1198.

NILKITKWA RIVER

PHI (No. 25, Fig. C)

LOCATION: Lat. 55°35–43′ Long. 126°33–38′ (93M/10E)
At approximately 2,500 feet elevation, 16 miles north of the village of Babine along east side of Nilkitkwa River.

CLAIMS: PHI, totalling 200.

ACCESS: By helicopter from Smithers, 55 miles.

OWNER: CANADIAN SUPERIOR EXPLORATION LIMITED, Box 100, Smithers.

METAL: Copper.

DESCRIPTION: Sill-like bodies of altered porphyry intrude Mesozoic sediments consisting of mudstones, sandstones, conglomerates, etc. Minor copper and zinc mineralization has been noted in the porphyry.

WORK DONE: Surface geological mapping, 1 inch equals 2,640 feet on 75 Phi claims; electromagnetic survey (Crone JEM), 50 line-miles and magnetometer survey, 50 line-miles covering same claims; induced polarization survey, 12 line-miles covering Phi 18 to 88.

REFERENCES: Assessment Reports 2493, 2723.

MOUNT THOMLINSON

BEAR (LAURA) (No. 9, Fig. C)

LOCATION: Lat. 55°32.5′ Long. 127°37′ (93M/12E)
At approximately 4,500 feet elevation, on the western flank of Mount Thomlinson between McCutcheon and Sterritt Creeks, 20 miles north of Hazelton.

CLAIMS: BEAR 1 to 22, HAM 1 to 8.

ACCESS: By access road from Hazelton-Kisgegas road, 3 miles.

OPERATOR: MIDWEST OIL CORPORATION, 1700 Broadway, Denver, Colo.

METALS: Molybdenum (copper).

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; geological study of old and new drill core; surface diamond drilling, one hole totalling 1,542 feet on Bear claims.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 113–116.

KAZA LAKE

FIRE (No. 7, Fig. C)

LOCATION: Lat. 55°58.7′ Long. 126°21′ (93M/16W)
At approximately 3,800 feet elevation, 4 miles south-southwest of Kaza Lake.

CLAIMS: FIRE, BURN, approximately 50.

ACCESS: By cat-road from Bulkley House, 28 miles.

OWNER: KAZA COPPER LIMITED, 1214 Eastview Road, North Vancouver.

METALS: Copper, silver, gold.

DESCRIPTION: Chalcopyrite is disseminated in volcanic and sedimentary rocks near shear zones.

WORK DONE: Topographic survey, 1 inch equals 100 feet; road constructed, 28 miles from Bulkley House at the north end of Takla Lake to the property.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, pp. 88, 89; 1968, p. 118; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 108, 109; Assessment Report 1191.

CHUCHI LAKE

CAMP (No. 25, Fig. E)

LOCATION: Lat. 55°05′ Long. 124°35′ (93N/2E)
At approximately 3,300 feet elevation, 5 miles south of Chuchi Lake.

CLAIMS: CAMP 1 to 52.

ACCESS: By air from Fort St. James, 50 miles.

OPERATOR: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.

METALS: Copper, molybdenum.

Description: Very fine-grained disseminated chalcopyrite within dioritic amphibolite.

Work done: Magnetometer survey, 12 line-miles; geochemical soil survey, 98 samples covering Camp 2, 5, 7, 11, 13, and 16 claims; trenching, 200 feet.

COL (No. 39, Fig. E)

Location: Lat. 55°14′ Long. 124°44–45′ (93N/2E)
At approximately 4,000 feet elevation, 4 miles north of the west end of Chuchi Lake.

Claims: COL 1 to 60.

Access: From Chuchi Lake by trail, 4 miles.

Operator: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Fracture system in monzonite host locally carrying chalcopyrite and bornite.

Work done: Surface geological mapping, 1 inch equals 200 feet on 10 claims; electromagnetic survey, 15 line-miles covering 10 claims; geochemical soil survey, 800 samples covering 20 claims; trenching, 80 cubic yards on Col 1; packsack drilling, eight holes totalling 320 feet on Col 1, 4, and 5.

Reference: Assessment Report 2714.

JEAN (No. 10, Fig. E)

Location: Lat. 55°04.5′ Long. 124°47–53′ (93N/2W)
At approximately 4,300 feet elevation, at the head of Jean Marie Creek.

Claims: JEAN 1 to 14, 17 to 44, 45 Fraction, 46 Fraction, 47 to 128.

Access: By helicopter from Fort St. James, 50 miles.

Owner: W. R. BACON, 1720, 1055 West Hastings Street, Vancouver 1, for NBC Syndicate.

Metals: Copper, molybdenum.

Description: Copper and molybdenum anomalies occur in soils overlying granodiorites and feldspar porphyries intruding metasedimentary rocks.

Work done: Induced polarization survey, approximately 9 line-miles; geochemical soil survey, approximately 750 samples; surface diamond drilling, three holes totalling 922 feet on Jean 30, 32, and 34.

References: Assessment Reports 2241, 2242, 2626 (line-cutting).

JW (No. 13, Fig. E)

Location: Lat. 55°05′ Long. 124°54′ (93N/2W)
At approximately 4,000 feet elevation, at the head of an unnamed creek west of Jean Marie Creek.

Claims: JW 1 to 128, 129 Fraction to 134 Fraction; JEAN 134 to 143, 144 Fraction, 145 Fraction.

Access: By helicopter from Fort St. James, 50 miles.

Owner: W. R. BACON, 1720, 1055 West Hastings Street, Vancouver 1, for NBC Syndicate.

Metals: Copper, molybdenum.

Work done: Induced polarization survey, approximately 4 line-miles; geochemical soil survey, approximately 1,000 samples; surface diamond drilling, two holes totalling 467 feet on JW 105 claim.

TCHENTLO LAKE

BAL, PJ, TC, A (No. 50, Fig. E)

By N. C. Carter

Location: Lat. 55°12.5′ Long. 125°05′ (93N/3E)
On the north shore of Tchentlo Lake, 6 miles from its west end.

Claims: BAL 1 to 16, PJ 1 to 20, TC 1 to 10, A 1 to 5 Fractions.

Access: By float plane or helicopter from Fort St. James, a distance of 70 miles, or alternatively by boat 35 miles from the east end of Chuchi Lake.

Operator: TCHENTLO LAKE MINES LTD., 201, 1595 Fifth Avenue, Prince George.

Metals: Copper, molybdenum.

Description:

The claims are situated near the southwestern margin of the Hogem Batholith immediately east of the contact between the plutonic rocks of the batholith (Omineca intrusives) and Mesozoic volcanic rocks.

A number of trenches one-quarter of a mile north of Tchentlo Lake expose intensely iron-stained dioritic rocks which are slightly magnetic. The diorites are medium- to coarse-grained mesocratic rocks which consist essentially of plagioclase (andesine), 50 per cent; uralitic hornblende, 25 per cent; clinopyroxene, 10 per cent; with lesser amounts of chlorite, biotite, apatite, and magnetite. A 4-foot wide, east-striking aplitic dyke was noted cutting diorites in one of the trenches. North of the trench area, the plutonic rocks are medium- to coarse-grained gabbros in which augite constitutes 50 per cent of the rock by volume, with the remainder consisting of alteration products of plagioclase feldspar, including epidote and chlorite. Augite is partly altered to green uralitic hornblende and magnetite is the most common accessory mineral.

Sulphide mineralization in the vicinity of the trenches occurs principally as pyrite with lesser amounts of chalcopyrite or fractures with and without quartz. Both vertical and horizontal fractures contain sulphide mineralization. Coarse molybdenite flakes were noted in some quartz-filled fractures and in the matrix of the aplitic dyke rock. The gabbro to the north of the trenches is host to finely disseminated chalcopyrite.

Work done: Soil-sampling on a grid established over the entire claim group.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 107; Assessment Reports 1947, 2010, 2609, 2729.

HI (No. 11, Fig. E)

Location: Lat. 55°12–16′ Long. 125°05–10′ (93N/3E, 6E)
At approximately 3,500 feet elevation, on the north side of Tchentlo Lake.

Claims: HI 1 to 27, 28 Fraction, 29, 30, 31 Fraction, 32 Fraction, 100 to 155, 201 to 208.

Access: By fixed-wing aircraft from Fort St. James, 62 miles.

Owner: W. R. BACON, 1720, 1055 West Hastings Street, Vancouver 1 (for NBC Syndicate).

Metal: Copper.

Description: Pyrite and chalcopyrite occur in basic to intermediate intrusives cutting sedimentary and volcanic rocks.

Work done: Surface geological mapping, 1 inch equals 400 feet on HI 11 to 22 and 100 to 109; magnetometer survey, 19.7 line-miles covering 37 claims;

electromagnetic survey, 7.8 line-miles covering 18 claims; geochemical soil survey, 318 samples covering all or parts of 17 claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 107; Assessment Reports 1947, 2321, 2617.

NS (No. 16, Fig. E)

LOCATION: Lat. 55°16′ Long. 125°10′ (93N/6E)
Two miles east of Nation River, which joins Indata and Tchentlo Lakes.

CLAIMS: NS 1 to 47.

ACCESS: By aircraft, 60 miles northwest of Fort St. James.

OPERATOR: SENATE MINING AND EXPLORATION LIMITED, 355 Burrard Street, Vancouver 1.

METALS: Copper, mercury.

WORK DONE: Topographic mapping and geochemical soil survey.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 106; Assessment Report 2799.

KWANIKA CREEK

BOOM, FRANKIE (No. 56, Fig. E)

By N. C. Carter

LOCATION: Lat. 55°28–32.5′ Long. 125°18–21′ (93N/6W, 11W)
At 3,100 feet elevation, on Kwanika Creek, from 3 to 8 miles north of its mouth at the east end of Tsayta Lake.

CLAIMS: BOOM, FRANKIE, BUD, CU, BH, HG, KS, JAN, T GEE, TX, CHO, MG, OVP, JAM, totalling 120.

ACCESS: East from Germansen Landing by road, 75 miles.

OWNER: GREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD., 736 Eighth Avenue SW., Calgary 2, Alta.

METALS: Copper, molybdenum.

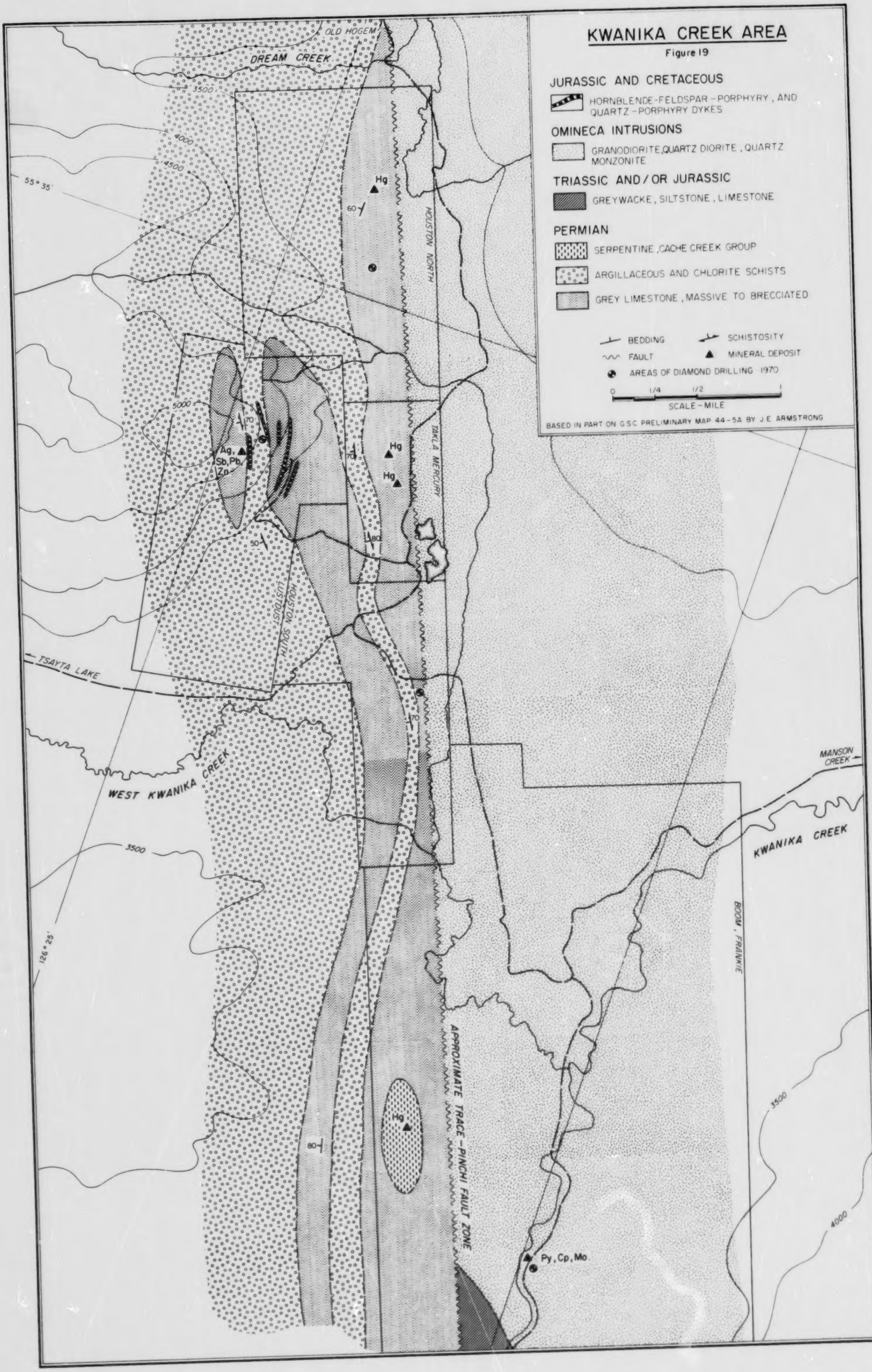
DESCRIPTION:

These claims are situated along Kwanika Creek, just south of the Houston south claims (*see* Fig. 19). Since 1965, when bulldozer trenching and limited drilling were done on the claims, exploratory work has included 6,000 feet of diamond drilling, plus additional trenching and geological, geochemical, and geophysical surveys.

A cinnabar showing in a sill-like body of serpentine intruding limestone in what is now the western part of the present claim group was investigated in the early 1940's.

The Pinchi fault zone lies west of Kwanika Creek, such that the major part of the claim group is underlain by granitic rocks of the Hogem Batholith. Thinly bedded greywackes and siltstones outcrop along Kwanika Creek half a mile south of the main area of interest (*see* Fig. 19).

Copper and minor molybdenum mineralization occurs along Kwanika Creek. Most of the original trenches are now sloughed in, but a trenched area just south of West Kwanika Creek, near its confluence with Kwanika Creek, exposes a medium-grained massive quartz monzonite. Much of the recent drilling has been in the main showings area and an examination of drill core indicated a variety of granitic rock types and hybrid volcanic rocks. The most common rock type is a fractured quartz monzonite which is an equigranular medium-grained pink rock consisting of nearly equal proportions of plagioclase (oligoclase) and perthitic potash feldspar, with interstitial quartz, chloritized biotite and hornblende, and accessory sphene



KWANIKA CREEK AREA

Figure 19

JURASSIC AND CRETACEOUS
HORNBLENDE-FELDSPAR-PORPHYRY, AND QUARTZ-PORPHYRY DYKES
OMINECA INTRUSIONS
GRANODIORITE, QUARTZ DIORITE, QUARTZ MONZONITE
TRIASSIC AND / OR JURASSIC
GREYWACKE, SILTSTONE, LIMESTONE
PERMIAN
SERPENTINE, CACHE CREEK GROUP
ARGILLACEOUS AND CHLORITE SCHISTS
GREY LIMESTONE, MASSIVE TO BRECCIATED
BEDDING
SCHISTOSITY
FAULT
MINERAL DEPOSIT
AREAS OF DIAMOND DRILLING 1970
0
1/4
1/2
1
SCALE-MILE
BASED IN PART ON G.S.C. PRELIMINARY MAP 44-5A BY J.E. ARMSTRONG
OLD HOGEM
DREAM CREEK
3500
4000
4500
5000
55° 35'
126° 25'
Hg
60
70
50
80
HOUSTON NORTH
TAKLA MERCURY
HOUSTON SOUTH
LUSTDUST
Ag, Sb, Pb, Zn
TSAYTA LAKE
WEST KWANIKA CREEK
MANSON CREEK
KWANIKA CREEK
BOOM, FRANKIE
APPROXIMATE TRACE - PINCHI FAULT ZONE
Py, Cp, Mo.

and apatite. Epidote and chlorite are commonly on fractures with pyrite. Feldspars are usually clouded by sericite and carbonate. Where intensely brecciated, subrounded fragments of quartz monzonite are contained in a fine-grained matrix of quartz, feldspar, carbonate, chlorite, and pyrite. Some leucocratic, aplitic phases were noted and one variety, a granodiorite, is in part foliated with more mafic minerals and calcic plagioclase.

Drill sections of sheared and brecciated volcanic rocks, originally crystal-lithic tuff breccias, were noted. These rocks commonly contain abundant stringers and disseminations of pyrite and lesser amounts of pyrrhotite and chalcopyrite.

The granitic rocks are cut locally by 1-foot wide greenstone dykes which in some cases exhibit a directional fabric and which are apparently postmineral in age.

The quartz monzonites and the hybrid volcanic rocks are transected by numerous fractures ranging from hairline chloritic slips to one-quarter or one-half-inch quartz-potash feldspar filled veinlets. Sulphide mineralization is mainly restricted to fracture planes and brecciated zones. Pyrite is the dominant sulphide mineral, with lesser chalcopyrite and minor molybdenite.

WORK DONE: Induced polarization survey covering Boom 1 to 6; surface diamond drilling, two holes totalling 2,360 feet on Boom 3 and 4.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 105, 106; *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 119; 1966, p. 119; 1965, pp. 105, 106.

KLAWLI LAKE

LUC (No. 44, Fig. E)

LOCATION: Lat. 55°19′ Long. 124°52′ (93N/7W)
About 4 miles east of Klawli Lake, north of Tchentlo Lake.

CLAIMS: Four LUC.

ACCESS: By helicopter from Germansen Landing.

OWNER: JOHN KING, Fort St. James.

METAL: Copper.

DESCRIPTION: Malachite and chalcopyrite with calcite and hematite occur in a pyritic zone in andesitic rocks.

WORK DONE: Geological, magnetometer, and geochemical surveys.

REFERENCE: Assessment Report 2450.

MANSON CREEK

KEN (LONNIE) (No. 36, Fig. E)

LOCATION: Lat. 55°41′ Long. 124°23′ (93N/9W)
Between 3,300 and 3,750 feet elevation, on the southeast side of Granite Creek, about 1½ miles from the Fort St. James–Manson Creek road.

CLAIMS: KEN 1 to 8.

ACCESS: Five miles east from Manson Creek by road.

OWNER: MANSON LAKE MINES LIMITED, 800, 900 West Hastings Street, Vancouver 1.

METALS: Zirconium, niobium, uranium.

DESCRIPTION: Disseminated pyrochlore and zircon in a carbonatite dyke.

WORK DONE: Old access road cleaned out; trenching, 605 feet on Ken 4 and 6.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1954, p. 96; 1955, p. 29.

BILLY, GLO (No. 26, Fig. E)

Location: Lat. 55°40′ Long. 124°29′ (93N/9W)
At approximately 2,500 feet elevation, near Manson Creek.

Claims: BILLY 1A to 8A, 9 to 43; GLO 1 to 4; GOLDEN BEAUTY 3 to 8; GOLDEN KEY 1, 2; BLUE BIRD 1, 2; BLUE JAY 1 to 3.

Access: By road from Manson Creek, 2 miles.

Operator: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metal: Tungsten.

Description: Scheelite occurs in quartz stringers in axial plane cleavages in fold zones contemporaneous with movements of Manson fault zone.

Work done: Surface geological mapping, 1 inch equals 200 feet on 14 claims; trenching, 250 cubic yards on Glo 1 and 3 and Golden Beauty 3; packsack drilling, six holes totalling 250 feet on Golden Key 1 and Golden Beauty 3.

A, B (BLACKJACK) (No. 46, Fig. E)

Location: Lat. 55°35′ Long. 124°30′ (93N/9W)
About 7 miles due south of Manson Creek.

Claims: A 1 to 16, B 1 to 13.

Access: By 14 miles of rough road along Manson Creek south from the settlement of Manson Creek.

Operator: JAVELIN MINES LTD., 714 West Hastings Street, Vancouver 1.

Metal: Molybdenum.

Description: Minor amounts of molybdenite occur in rusty (pyritic) quartz and aplite veins cutting schistose argillites and fine-grained quartzites.

Work done: Geological and geochemical surveys.

References: *Minister of Mines, B.C.,* Ann. Rept., 1965, p. 106; Assessment Reports 2185, 2689.

OLD HOGEM

TWIN (No. 12, Fig. E)

Location: Lat. 55°40′ Long. 125°18.5′ (93N/11W)
At approximately 5,300 feet elevation, at the head of Twin Creek.

Claims: TWIN 1 to 16, 18, 27, 29, 31, 33, 35, 37, 38, 43, 44.

Access: By helicopter from Fort St. James, 94 miles (approximately 6 miles from Kwanika Creek road).

Owner: W. R. BACON, 1720 1055 West Hastings Street, Vancouver 1, for the NBC Syndicate.

Metal: Copper.

Description: Pyrite and chalcopyrite in altered volcanics near contact with granodiorite.

Work done: Geochemical soil survey, 235 samples on Twin 1, 3 to 8, 10, 12, 29, 31, and 33.

Reference: Assessment Report 2501.

HOUSTON (No. 45, Fig. E)

By N. C. Carter

Location: Lat. 55°32–36′ Long. 125°22–26′ (93N/11W)
Two Houston claim blocks are north of the confluence of Kwanika and West Kwanika Creeks and are situated north and south of the former Bralorne-Takla mercury mine.

CLAIMS: HOUSTON 1 to 50 (formerly BRON).

ACCESS: North from Fort St. James by road, 175 miles.

OWNER: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

METAL: Mercury.

DESCRIPTION:

The Houston claims are grouped into two blocks which adjoin the former Takla mercury mine on the north and south (*see* Fig. 19). The Houston North and Houston South claims include the old Lil and Bron properties respectively. Exploration work was done by The Consolidated Mining and Smelting Company of Canada, Limited on both properties in the early 1940's.

The Houston claims are underlain principally by limestones and intercalated schistose greenstones and siltstones of the Cache Creek Group. These rocks have been severely deformed and brecciated by the Pinchi fault zone which traverses the claim groups in a northwesterly direction and separates the sedimentary rocks of Permian age from Jurassic volcanic rocks and granitic rocks also believed to be of Jurassic age (*see* Fig. 19). Much of the area occupied by the fault zone is drift covered. At the Bralorne-Takla mine, mercury in the form of cinnabar occurred in blebs and veinlets in brecciated limestones adjacent to small faults subsidiary to the Pinchi fault zone.

Bedrock on the Houston South claims is exposed in trenches south of the Manson Creek road and along a 10 to 20-foot-high northwest-trending ridge or scarp bordering a creek and swampy area marking the course of the Pinchi fault. The grey limestone forming the ridge or scarp is severely brecciated. In the trench area, brecciated limestone occurs in which one-half to 1-inch subangular fragments of limestone are cemented by dolomite. Secondary calcite occurs in hairline fractures. In thin-section, the carbonate in the matrix between the fragments displays bent twin lamellæ, while some fragments exhibit a cataclastic texture and others do not. Interbedded with the limestone in the trenches are greenstone schists and rusty brown slaty siltstones which strike north-northwest and dip steeply west.

Drilling on the Houston South claims was done near the northernmost trench and consisted of one vertical and two angle holes put down to test a Lemaire mercury soil anomaly detected in the swampy area overlying the fault zone. Two of the holes failed to reach bedrock after passing through as much as 190 feet of overburden. The third hole drilled through 450 feet of brecciated limestone. An X-ray drill was deployed on the southern part of the claim group to test secondary mercury anomalies.

The Pinchi fault zone on the Houston North claim block is also obscured by a large, open, swampy area, bordered on the west by a 100-foot-high limestone bluff above which the ground rises fairly steeply. Cinnabar mineralization occurs as disseminated grains and blebs in secondary calcite vugs in brecciated limestone that is exposed in a small creek in the northern part of the claim block. This area, which was drilled in the early 1940's with negative results, also failed to show up in a recent soil geochemical programme using a Lemaire mercury detector. Approximately 1,500 feet south along the ridge, an anomalous area, roughly 1,000 feet in diameter, was tested by 4,000 feet of NQ drilling.

WORK DONE: Claims and surface workings mapped; road construction, 2 miles; trenching, 550 feet on Houston 23; surface diamond drilling, 19 NQ holes totalling 4,784 feet on the Houston 21 to 23 and 6 X-ray holes totalling 383 feet on the Houston 5, 7, 8, and 12.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 105; Assessment Report 1755; *Geol. Surv., Canada,* Mem. 252, pp. 160, 161; Paper 44-5.

AMY (No. 24, Fig. E)

Location: Lat. 55°40′ Long. 125°29′ (93N/11W)
At approximately 3,000 feet elevation, on Silver Creek, 13 miles north of Bralorne-Takla mercury mine.

Claims: AMY 1 to 10 (Snell group).

Access: By road from Manson Creek, 60 miles.

Operator: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Mercury.

Description: Cinnabar occurs in dolomitized and brecciated limestone and chert and along limestone-tuff contacts. Large shear zone in central part of Pinchi fault.

Work done: Geochemical survey, 155 samples on Amy 1 to 10; surface diamond drilling, four NQ holes totalling 957 feet on Amy 9 and 10.

DUCKLING CREEK

MISTY (No. 22, Fig. E)

Location: Lat. 55°55′ Long. 125°31′ (93N/13E)
At approximately 5,000 feet elevation, on Duckling Creek.

Claims: MISTY 1 to 14.

Access: By helicopter from Smithers, 100 miles.

Owner: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Copper.

Description: Chalcopyrite in northwest-trending shear zone through diorite complex.

Work done: Surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 9.33 line-miles; geochemical survey, 493 samples on Misty 1 to 6 claims.

References: *Minister of Mines, B.C.*, Ann. Rept., 1949, p. 98 (*see* Kay claims); Assessment Report 2778.

LORRAINE (No. 23, Fig. E)

Location: Lat. 55°56′ Long. 125°28′ (93N/14W)
At approximately 5,800 feet elevation, on Duckling Creek.

Claims: LORRAINE 1 to 12; LORREX 1, 2; GK 1 to 21.

Access: By road and helicopter from Germansen Landing, 30 miles.

Owner: Kennco Explorations, (Canada) Limited.

Operator: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

Metal: Copper.

Description: Chalcopyrite, bornite, and magnetite in paragneiss.

Work done: Surface diamond drilling, eight holes totalling 4,593 feet on Lorraine 2 to 4 claims.

References: *Minister of Mines, B.C.*, Ann. Rept., 1949, p. 98; Assessment Report 506.

DUCK, DUKE, RONDAH (No. 14, Fig. E)

LOCATION: Lat. 55°52′ Long. 125°18′ (93N/14W)
At approximately 5,400 feet elevation, 26 miles west-northwest from Germansen Landing in Duckling Creek area.

CLAIMS: Approximately 52 DUCK, 24 DUKE, 45 RONDAH, 5 LEA.

ACCESS: By Uslika Lake road from Germansen Landing, 27 miles.

OWNER: TYEE LAKE RESOURCES LTD., 312, 510 West Hastings Street, Vancouver 2.

METALS: Copper, iron, molybdenum.

DESCRIPTION: Contact metasomatic mineralization in syenodiorite and porphyritic basalt along a major batholithic contact.

WORK DONE: Topography and surface workings mapped; surface geological mapping, 1 inch equals 1,000 feet on 70 claims and 1 inch equals 200 feet on two claims; induced polarization survey, 10 line-miles covering Rondah 1 to 16; geochemical silt, soil, and rock chip survey, approximately 440 samples covering Duck and Rondah claims; road construction, 8 miles (to Rondah claims from mile 26); trenching, 3,000 feet on Rondah claims; surface diamond drilling, five holes totalling 3,000 feet on Rondah claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1949, p. 98; 1951, p. 118; Assessment Reports 73, 378, 384, 430, 513, 532.

DUCKLING (No. 15, Fig. E)

LOCATION: Lat. 55°50′ Long. 125°20′ (93N/14W)
Between 3,200 and 5,000 feet elevation, 28 miles west of Germansen Landing, 6 miles north of the confluence of Duckling Creek and Omineca River.

CLAIMS: DUCKLING 1 to 34, 39 to 41; DUCKLING 1 to 6 Fractions; DUCK 1 to 3, 28 to 109; AL 1 to 24; FRONT 1 to 18.

ACCESS: By four-wheel-drive vehicle from the Germansen-Uslika Lake road junction, 4 miles.

OPERATOR: DONNA MINES LTD., 642 Clark Drive, Vancouver 6.

METAL: Copper.

DESCRIPTION: Chalcopyrite occurs in fractures in syenite porphyry.

WORK DONE: Topography mapped; geochemical soil survey, 700 samples; trenching, 1,500 feet; stripping, 500 feet on Duckling 1 to 6 and 1 to 6 Fractions; road construction, 4 miles; surface diamond drilling, three holes totalling 1,000 feet on Duckling 1.

USLIKA LAKE

DOVE (No. 40, Fig. E)

LOCATION: Lat. 56°00′ Long. 125°38–44′ (94C/4E)
At approximately 5,000 feet elevation, 18 miles west of Uslika Lake.

CLAIMS: DOVE 1 to 172, 179, 181 to 210, 213 to 226, 231 to 264, 271 to 278.

ACCESS: Seventy-eight miles from Germansen Landing by road to a point 12 miles from the claims.

OWNER: UNION MINIERE EXPLORATIONS AND MINING CORPORATION LIMITED, Suite 4105, One Place Ville Marie, Montreal, P.Q.

METAL: Copper.

DESCRIPTION: Chalcopyrite, malachite, and bornite disseminated in altered hornblende syenite.

Work done: Surface workings mapped; surface geological mapping, 1 inch equals approximately 900 feet and 1 inch equals one-half mile covering all Dove claims; geochemical soil and silt survey, 1,122 samples (silt samples covering entire claim group and soil samples covering Dove 177 to 186, 193 to 200, and 207 to 210 claims).

CARIBOO HEART RANGE

FRED, BOBO, MARG (NORTHSTAR) (No. 6, Fig. C)

Location: Lat. 56°03′ Long. 126°15.5′ (94D/1W)
Between 4,000 and 5,000 feet elevation, in the Cariboo Heart Range.

Claims: FRED, BOBO, MARG, GED, TINA, and others, 126 in all.

Access: By cat-road from Bulkley House, 30 miles.

Owner: NORTHSTAR COPPER MINES LTD., 1214 Eastview Road, North Vancouver.

Metals: Copper (minor silver, gold).

Description: Chalcocite, bornite, minor native copper, and chalcopyrite occur in veins, fractures, and as disseminations in andesite and shales.

Work done: Topographic survey, 1 inch equals 100 feet; road constructed, 35 miles from Bulkley House to showings (cat-road for 20 miles, then truck-road).

References: *Minister of Mines, B.C.,* Ann. Rept., 1967, p. 86; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 102; Assessment Reports 833, 1084.

BEAR LAKE

COPPER, MAGNUM (No. 33, Fig. C)

Location: Lat. 56°14′ Long. 127°04′ (94D/3E)
Between 4,600 and 6,200 feet elevation, 8 miles northwest of Bear Lake.

Claims: COPPER 1 to 60, MAGNUM 1 to 34, ROONX 1 to 16, LNOX 1 to 5.

Access: By aircraft from Smithers, 100 miles.

Owner: ROOSEVELT MINES LTD., 1110, 10235—124th Street, Edmonton, Alta.

Metals: Copper, silver.

Description: Takla volcanic rocks are intruded by diorites. Alteration consists of chloritization, feldspathization, and silicification. Metallic minerals in order of abundance are bornite, chalcopyrite, tetrahedrite, chalcocite, malachite, and some galena and pyrite.

Work done: Trenching totalling 400 feet and six pits totalling 750 cubic yards on Magnum 7 and Roonx 15 and 16.

KLIYUL CREEK

CROY (SHELL) (No. 32, Fig. C)

Location: Lat. 56°28′ Long. 126°02′ (94D/8E)
At approximately 6,000 feet elevation, 2½ miles north of Kliyul Creek, 11 miles northwest of Aiken Lake.

Claims: CROY 1 to 17.

Access: By helicopter from Aiken Lake, 11 miles.

Owner: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metals: Copper, gold, silver.

Description: Faulted and fractured volcanic flows intruded by granites. Mineralization consists of massive veins of chalcopyrite, pyrite, pyrrhotite, and magnetite. Extensive epidote alteration.

Work done: Surface geological mapping, 1 inch equals 50 feet; magnetometer survey, 6.57 line-miles; electromagnetic survey, 6.57 line-miles; geochemical survey, 300 samples covering Croy 1 to 4 and 17.

References: *Geol. Surv., Canada,* Mem. 251, p. 60; *Minister of Mines, B.C.,* Ann. Rept., 1947, pp. 103, 104.

KLI (No. 91, Fig. C)

Location: Lat. 56°30′ Long. 126°06′ (94D/9E)
Near the hearwaters of Kliyul Creek, at an elevation of 5,700 feet.

Claims: KLI 1 to 38.

Access: One hundred and twenty-five miles north by aircraft from Smithers.

Owner: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, One Bentall Centre, Vancouver 1.

Work done: A grid was established and a magnetometer survey was carried out on the west central part of the claim group.

Reference: Assessment Report 2818.

DUNCAN LAKE

RAT (No. 3, Fig. C)

Location: Lat. 57°02′ Long. 126°47′ (94E/2W)
About 5,000 feet elevation, at the south end of Duncan Lake, 4 miles east of Thutade Lake.

Claims: RAT 1 to 26.

Access: By air from Telkwa, approximately 200 miles.

Owner: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

Metal: Copper.

Description: Quartz monzonite and quartz feldspar porphyry have intruded andesite and rhyolite flows of the Takla Group. An alteration zone occurring within the intrusives and the country volcanic rocks appears silicified and rich in pyrite. Minor chalcopyrite is found in calcite veins which cut the intrusive.

Work done: Geochemical soil survey, 20 samples covering Rat 7 to 10 and Rat 1 Fraction; surface diamond drilling, one hole totalling 287 feet on Rat 17.

References: Assessment Reports 1908, 2406.

THUTADE LAKE

LAWYERS (No. 4, Fig. C)

Location: Lat. 57°18–20′ Long. 127°12–15′ (94E/6E)
At 5,000 feet elevation, 20 miles northwest of Thutade Lake.

Claims: LAWYERS 1 to 54.

Access: By fixed-wing aircraft from Smithers, 175 miles.

Owner: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

Description: Takla volcanics and limestones are overlain by Sustut Group sedimentary rocks. Porphyritic rocks may be small intrusions or flows.

Work done: Geochemical soil survey, 900 samples covering 10 claims.

Reference: Assessment Report 2822.

CHAPPELLE (No. 5, Fig. C)

LOCATION: Lat. 57°17′ Long. 127°06.5′ (94E/6E)
At approximately 5,500 feet elevation, 17 miles northwest of Thutade Lake.

CLAIMS: CHAPPELLE 1 to 30, 33 to 42.

ACCESS: By fixed-wing aircraft from Smithers, 175 miles.

OWNER: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

DESCRIPTION: Takla volcanics and limestones are overlain by sedimentary rocks of the Sustut Group. All rocks are cut by a variety of intrusive rocks, including syenites and porphyries.

WORK DONE: Magnetometer survey, 2 line-miles on Chappelle 3 and 4; geochemical soil survey, 210 samples covering Chappelle 1 to 6; trenching, 2,200 feet on Chappelle 3 and 4.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 103; Assessment Reports 2582, 2819.

TOODOGGONE RIVER

ED, EHL, BELLE (No. 39, Fig. C)

LOCATION: Lat. 57°28′ Long. 127°05′ (94E/6E)
Lower Belle Lake and Midas Creek, Toodoggone River area, at approximately 5,000 feet elevation.

CLAIMS: ED 1 to 14, EHL 1 to 12, BELLE 1 to 42.

ACCESS: By fixed-wing aircraft from Watson Lake, Y.T., 165 miles.

OWNER: ALAKON METALS LTD., 202, 569 Howe Street, Vancouver 1.

METALS: Copper, silver.

WORK DONE: Magnetometer survey.

REFERENCE: Assessment Report 2506.

MOUNT BASNETT

REV, RPM (No. 31, Fig. C)

LOCATION: Lat. 57°32′ Long. 126°14′ (94E/9E)
On Mount Basnett, at elevations ranging from 3,500 to 6,000 feet.

CLAIMS: REV 1 to 4, RPM 1 to 23.

ACCESS: By aircraft from Fort St. John, 250 air-miles northwest.

OPERATOR: HIGHPLAIN EXPLORATION LTD., Box 96, Fort St. John.

METAL: Copper.

DESCRIPTION: Gossan area, with visible pyrite and chalcopyrite, occurs in a shear zone near a limestone-slate contact.

WORK DONE: Ground electromagnetic survey; geological survey.

REFERENCES: Assessment Reports 2470, 2471.

TERRACE

DOR (No. 72, Fig. C)

LOCATION: Lat. 54°27′ Long. 128°01′ (103I/8E)
At the confluence of the Clore and Zymoetz Rivers.

CLAIMS: DOR 1, 2.

ACCESS: By Zymoetz River logging-road, 20 miles east of Terrace.

OPERATOR: ARDO MINES LTD., 630, 890 West Pender Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Chalcopyrite, malachite, and barite occur in joints and shears through Hazelton volcanics.

WORK DONE: Reconnaissance geochemical surveying.

REFERENCES: Assessment Reports 1863, 2688.

ZYM, PANY, KOM, NATAN (No. 82, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°27′ Long. 128°08′ (103I/8E)
At approximately 1,500 feet elevation on the south bank of the Zymoetz River.

CLAIMS: Approximately 120.

ACCESS: By logging-road east from Terrace, 21 miles.

OWNERS: Native Mines Limited and Pechiney Development Limited.

OPERATOR: PECHINEY DEVELOPMENT LIMITED, 701, 744 West Hastings Street, Vancouver 1.

METALS: Copper, silver, gold.

DESCRIPTION:

The northern part of the area covered by the claims is illustrated on Figure 20. Hazelton Group volcanic rocks, including red and green basalts, andesites, and rhyolite-dacites and their fragmental equivalents, occupy a north-striking antiform. The west limb of the fold structure has been intruded by an elliptical stock of quartz diorite and granodiorite, oriented in an east-west direction and measuring 8,000 by 5,000 feet. Sill-like bodies of andesitic feldspar porphyry cut the Hazelton rocks in the axial region of the antiform. The age relationships between these and the granitic rocks is not conclusive; evidence exists for both an older and younger time of intrusion of the porphyries.

Most of the exploratory work has been done on the Upper and Lower showings which are situated in and adjacent to the northeast contact area of the granitic stock (*see* Fig. 20). The Lower showings, at an elevation of 1,600 feet, consists of chalcopyrite, bornite, and minor chalcocite occurring as fracture-fillings in a pink granodiorite. Many of the fractures are rimmed by secondary potash feldspar, and malachite staining is common. The zone, as exposed in trenches, is approximately 500 feet long by 50 feet wide.

The Upper showing, on which most of the work has been done, is exposed on surface in a number of trenches at an elevation of 1,800 feet. Intensely fractured rhyolite tuffs and breccias contain blebs and stringers of bornite and chalcopyrite, and bornite also occurs as disseminations in narrow dykes of light-grey rhyolite which cut both the volcanic rocks and the andesitic feldspar porphyry.

The Upper showing was tested by 16 surface holes put down by Native Mines Limited in 1966 and 1967. In late 1969, the optioning company completed a 1,000-foot-long exploration adit from which seven drill holes were drilled in 1970.

The adit was collared at 1,700 feet elevation in andesitic feldspar porphyry which continues through much of the first 500 feet of the adit (*see* Fig. 21). Twenty-five per cent of the rock consists of euhedral plagioclase phenocrysts (An_{28-32}) which range in size from 4 millimetres to more than 1 centimetre. The phenocrysts, commonly mantled by epidote, are generally randomly oriented. The matrix is made up of a fine-grained mosaic of plagioclase, chlorite, epidote, carbonate, and magnetite and varies in colour from reddish brown to green, depending on the amount of hematite and (or) epidote alteration. Amygdules of carbonate, up to 1 centimetre size, are common. The feldspar porphyry is a relatively massive unit, being cut by widely spaced northeast and northwest fractures and faults which dip

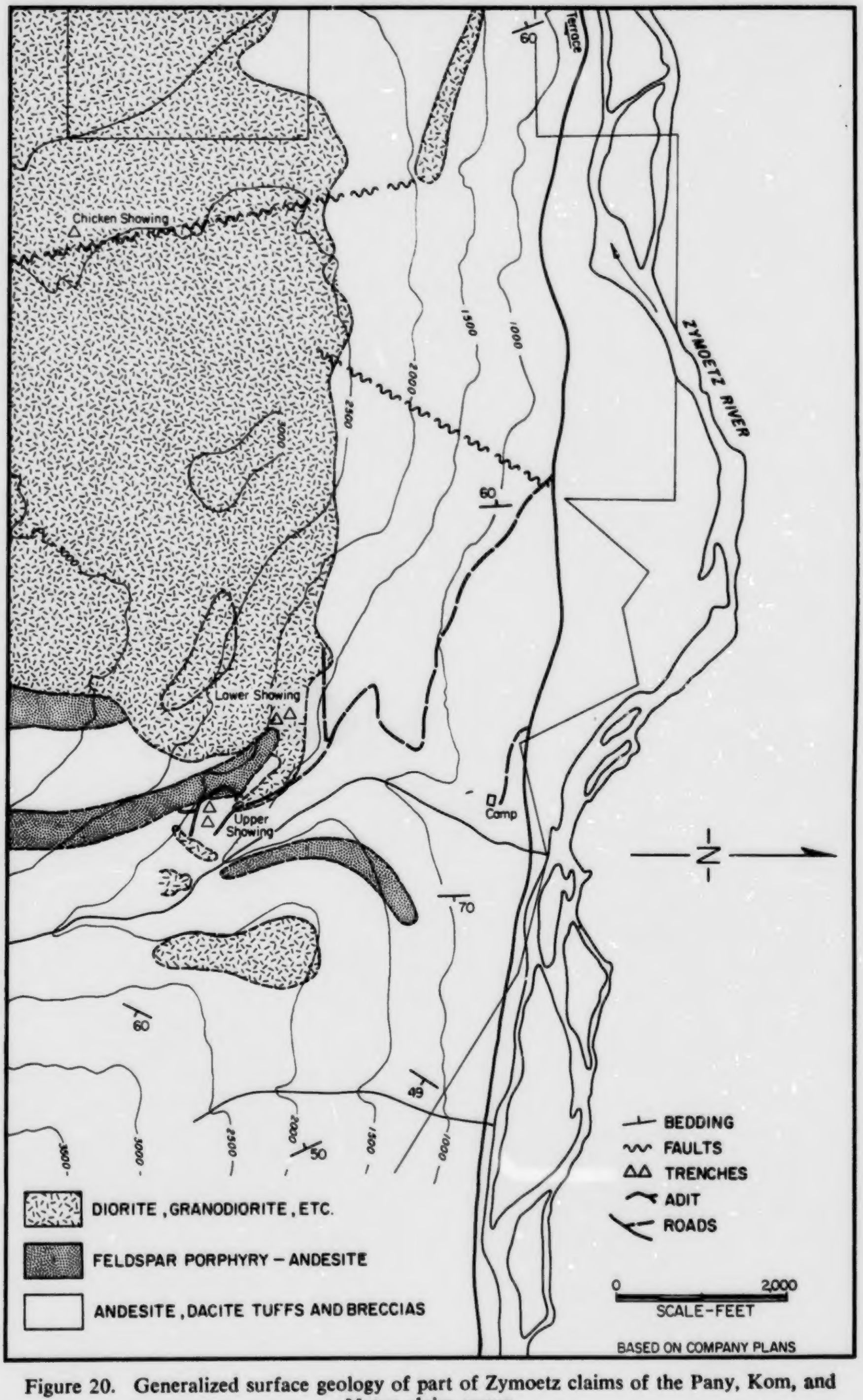

Terrace
60
Chicken Showing
3000
2500
2000
1500
1000
ZYMOETZ RIVER
60
Lower Showing
Upper Showing
Camp
N
70
60
49
3500
3000
2500
2000
50
1500
1000
BEDDING
FAULTS
ΔΔ TRENCHES
ADIT
ROADS
DIORITE, GRANODIORITE, ETC.
FELDSPAR PORPHYRY – ANDESITE
ANDESITE, DACITE TUFFS AND BRECCIAS
0
2,000
SCALE-FEET
BASED ON COMPANY PLANS

Figure 20. Generalized surface geology of part of Zymoetz claims of the Pany, Kom, and Natan claim group.

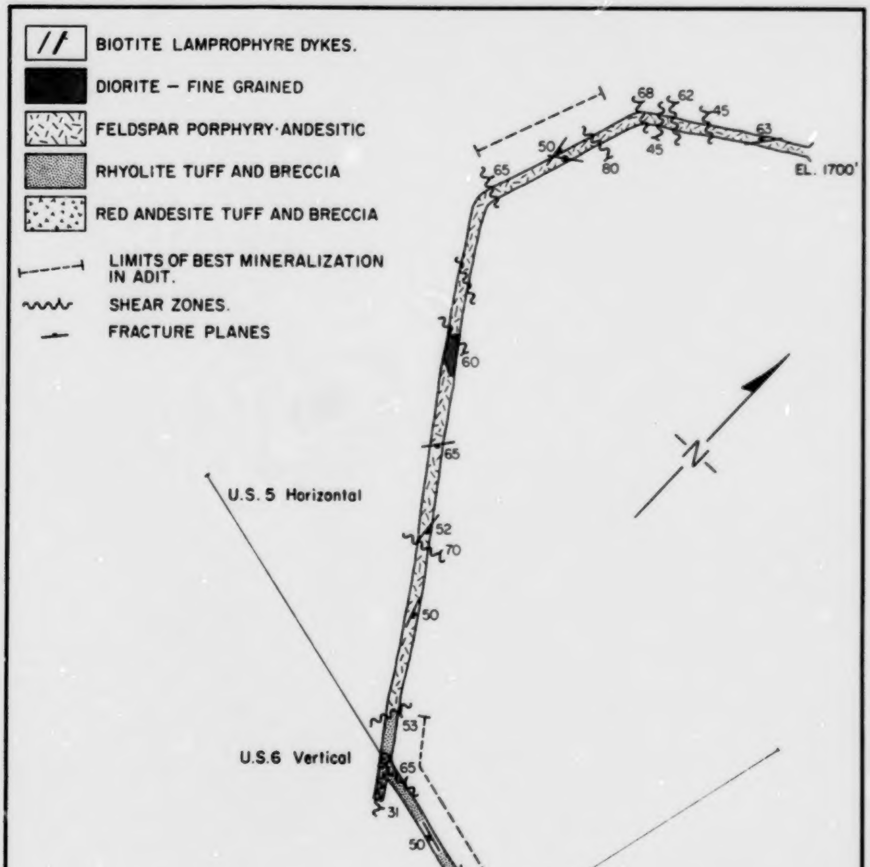

BIOTITE LAMPROPHYRE DYKES.
DIORITE – FINE GRAINED
FELDSPAR PORPHYRY-ANDESITIC
RHYOLITE TUFF AND BRECCIA
RED ANDESITE TUFF AND BRECCIA
LIMITS OF BEST MINERALIZATION IN ADIT.
SHEAR ZONES.
FRACTURE PLANES
EL. 1700'
N
U.S. 5 Horizontal
U.S.6 Vertical
U.S. 4 -60°
U.S. 2-Vertical
U.S. 1
U.S. 7
Horizontal
U.S. 3 Vertical
GEOLOGY BY N.C. CARTER
0
50
100
150
200
SCALE - FEET
UNDERGROUND PLAN FROM COMPANY SURVEY

Figure 21. Plan of 1700 level adit and 1970 underground drilling on the Zymoetz claims of the Pany, Kom, and Natan claim group.

at moderate angles to the east or west. Hematite and epidote are common on fractures and some malachite staining was noted in some of the shear zones.

At the 250-foot mark in the adit, a fine-grained, dark-grey, slightly magnetic microdiorite occurs as an inclusion in the feldspar porphyry which at this point appears to have chilled contacts.

At the 500-foot mark, the feldspar porphyry is in fault contact with brecciated and silicified rhyolite and dacite tuffs and breccias. These include a very fine-grained pink variety which exhibits a cataclastic texture and consists of a matrix composed essentially of quartz in which wispy areas of epidote occur. These areas of epidote, which impart a directional fabric, probably represent original lithic or pumiceous fragments. This rock type is gradational to a light-grey variety which features 1-inch potash feldspar segregations. Fracture spacing ranges from 1 to 5 inches, with most of the fractures striking northwest and dipping steeply. Chalcopyrite and bornite occur in fractures and brecciated areas in the rhyolite rocks, and epidote is common in and adjacent to fractures. The rhyolite-dacite unit continues to the end of the adit, where 3 to 6-inch elongate reddish fragments impart a directional fabric to the rock.

Near the end of the adit, the rhyolitic rocks are cut by 2 to 3-foot-wide fine-grained, dark-grey, hornblende-biotite-lamprophyre dykes. The dykes feature chilled contacts and contain abundant disseminated magnetite. They strike slightly east of north and are vertical to steeply dipping.

In the south crosscut, the rhyolitic rocks are separated from an east-striking fault from red andesite tuffs and breccias which are well jointed and cut by numerous carbonate stringers.

Best grades of mineralization encountered in the adit are contained in brecciated and silicified zones in the more brittle rhyolitic units, where bornite and chalcopyrite occur as fracture-fillings and as disseminations in brecciated zones locally rimmed by epidote. The best grade sections of mineralization are indicated on Figure 21. A company press release stated that an average grade of 0.65 per cent copper was obtained from sludge samples collected from blast holes drilled while driving the last 281 feet of the adit. This includes a 111-foot section grading 0.95 per cent copper and 0.58 ounce of silver per ton. Similar samples from the initial 24 feet of the south crosscut assayed 0.61 per cent copper and 0.2 ounce of silver per ton.

The mineralized zone strikes in an easterly direction and is limited on both the east and west by relatively massive feldspar porphyry which is only weakly mineralized. Drilling from the 1700 level indicated that the zone was also limited to the north and south and also below the level, with the exception of the area around drill hole US-6, where fair-grade mineralization extends 100 feet vertically below the level.

One thousand feet east of the Upper showings, chalcopyrite and bornite occur in red and grey-green andesites near their contact with a small granodiorite stock. One drill hole put down to test this zone intersected mainly feldspar porphyry cut by narrow lamprophyre dykes.

Two drill holes were abandoned after drilling through 240 feet of overburden in an attempt to test an induced polarization anomaly north of the Lower showings.

Several showings of chalcopyrite and bornite in fractures in andesitic rocks were found in the central and southern parts of the property. Some trenching was done on these showings.

The Chicken showing is situated in the granodiorite stock in the western part of the property at an elevation of 2,300 feet (*see* Fig. 20). Several trenches expose granodiorite in which chalcopyrite and bornite occur in fractures. Two drill holes intersected medium-grained equigranular light-grey to pink granodiorite exhibiting varying degrees of brecciation and chlorite-sericite and potash feldspar alteration. Pyrite was the main sulphide mineral seen, occurring as disseminations in the matrix. Minor molybdenite was noted on chloritic slip planes. Narrow lamprophyre dykes were seen cutting the granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 300 feet on Kelly 26 to 31 and Saint 1 to 8; induced polarization survey, 18 line-miles covering Kelly 26 to 31, Saint 1, 2, 5 to 8, 10, 11, Zymoetz 2, 4 to 7, 11, and Kelly 1, 3, 16; geochemical soil survey, 400 samples on Kelly 26 to 31 and Saint 1 to 8; surface diamond drilling, five holes totalling 1,900 feet on Saint 5, 6, and Zymoetz 2; underground diamond drilling, six holes totalling 2,499 feet on Zymoetz 2 and Kelly 3.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 78; Assessment Report 2394.

DARDANELLE (No. 14, Fig. C)

LOCATION: Lat. 54°29′ Long. 128°13′ (103I/8E)
Between 500 and 1,000 feet elevation, on the north side of the Zymoetz River.

CLAIMS: MONEYMAKER 1 to 3, MCNEIL 1 to 4.

ACCESS: By jeep-road from Terrace, 20 miles.

OWNER: UNIVEX MINING CORP. LTD., 215, 744 West Hastings Street, Vancouver 1.

METALS: Gold, silver, lead, zinc, copper.

DESCRIPTION: Pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, and argentite in a series of parallel quartz veins occurring parallel to and adjoining albite dykes.

WORK DONE: Claims and workings surveyed; 10 surface holes totalling 1,000 feet diamond drilled on Moneymaker 1 to 3.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 78; *Geol. Surv., Canada,* Mem. 329, pp. 78, 79.

HUB, FM, FORGETFUL (No. 149, Fig. C)

LOCATION: Lat. 54°39.5′ Long. 128°05.5′ (103I/9E)
At approximately 4,600 feet elevation, on the east branch of Legate Creek, 25 miles northeast of Terrace.

CLAIMS: HUB 1 to 20, FM 1 to 6, FORGETFUL 1 to 4.

ACCESS: By road from Terrace, 34 miles.

OWNER: HUB MINING & EXPLORATION LTD., Box 253, Nanaimo.

METALS: Copper, silver, lead, zinc, molybdenum.

WORK DONE: Road construction, approximately 1 mile; trenching, 100 feet on FM 1 to 6; percussion drilling, 90 holes totalling 360 feet on FM 1 to 6.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 83.

ALVIJA (No. 115, Fig. C)

LOCATION: Lat. 54°34′ Long. 128°09′ (103I/9E)
At approximately 2,000 feet elevation, on the north side of Kleanza Creek, 10 miles east of Highway 16.

CLAIMS: ALVIJA 1 to 36, ALVIJA 21 to 35, ALPINE 1 to 39, SOUX 1 to 14.

ACCESS: By road from Terrace, 20 miles.

OWNER: ALVIJA MINES LTD., 642 Clark Drive, Vancouver 6.

METALS: Copper, silver.

DESCRIPTION: Bornite occurs as disseminations in fracture zones in dacitic andesites.

WORK DONE: Surface workings mapped; surface diamond drilling, one hole totalling 580 feet on Alvija 2.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 82, 83; *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 107; *Geol. Surv., Canada*, Mem. 212, pp. 16, 17.

H (No. 81, Fig. C)

By N. C. Carter

LOCATION: Lat. 54°33′ Long. 128°19′ (103I/9W)
Between 1,500 and 2,500 feet elevation, on Kendall Creek, 12 miles east of Terrace.

CLAIMS: H, totalling 34.

ACCESS: Twelve miles east from Terrace by helicopter.

OPERATOR: McINTYRE PORCUPINE MINES LIMITED, 312, 409 Granville Street, Vancouver 2.

METAL: Copper.

DESCRIPTION:

A prominent gossan, roughly 2,400 feet in diameter, is exposed in the deeply incised canyons of Kendall Creek and its tributaries between 1,500 and 2,500 feet elevation. Central to the gossan is an intrusive body of feldspar biotite porphyry cutting intensely fractured volcanic rocks. The intrusive is rectangular in plan with its long direction trending east-west and its southern contact marked by a regional northwest-striking fault extending from the Zymoetz River. The porphyry is a quartz diorite, with 1 to 2-millimetre phenocrysts of plagioclase (andesine) and books of chloritized biotite constituting 20 per cent of the rock. The phenocrysts are set in a fine-grained matrix of quartz, feldspar, chlorite, epidote, apatite, and metallic minerals. Plagioclase is normally zoned and exhibits varying degrees of sericite alteration. Near its south contact, the porphyry is fine grained and silicification has obliterated the original texture.

The northern contact of the intrusive is sharply defined in Kendall Creek, and strikes east-west. The intruded rocks are commonly dense, fine-grained dark-green amphibole-rich volcanic rocks which locally contain secondary biotite in the matrix and on fractures. Fractures are closely spaced at one per 2 inches or less and are randomly oriented. They are generally one-eighth inch or less wide and are commonly filled with quartz, epidote, and metallic minerals. A one-eighth inch, bleached zone commonly borders many fractures.

In Kendall Creek, rocks are cut by unmineralized, magnetic, biotite lamprophyre dykes about 2 feet wide that strike northeastward and dip steeply to the north.

Pyrite, chalcopyrite, and minor molybdenite occur in fractures with quartz in both the intrusive and adjacent volcanic rocks.

WORK DONE: Magnetometer and geochemical silt and soil surveys.

REFERENCES: Assessments Reports 829, 2325.

CROESUS (No. 13, Fig. C)

LOCATION: Lat. 54°32′ Long. 128°27′ (103I/9W)
Between 500 and 3,750 feet elevation on the west side of Kleanza Mountain, 5 miles east of Terrace.

CLAIMS: Sixty-six CROESUS.

Access: By road from Highway 16, 1 mile.

Owner: Kleanza Mines Ltd.

Operator: NITTETSU MINING CO. LTD., 404, 470 Granville Street, Vancouver 2.

Metal: Copper.

Description: The Croesus mineral zone lies within and along the gradational contact of a complex granitic tongue intruding sediments and volcanics of the Hazelton series. Porphyritic phases are impregnated with pyrite and chalcopyrite. Gold and silver values are present. Mineralization is evident also in diorites and quartz diorites.

Work done: Induced polarization survey, 1 line-mile; road construction began in December.

References: *Minister of Mines, B.C.*, Ann. Rept., 1967, pp. 80–82; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 77, 78; Assessment Reports 1234, 1942.

GOLD STAR (No. 80, Fig. C)

By N. C. Carter

Location: Lat. 54°37′ Long. 128°28′ (103I/9W)
Between 1,400 and 4,700 feet elevation, 7 miles northeast of Terrace.

Claims: One hundred and forty, comprising the GOLD STAR, EASTERN STAR, ROB, DB, WRT, AM, WJB, GO, and BD groups.

Access: By helicopter from Terrace airport, 7 miles.

Owner: New Gold Star Mines Ltd.

Operator: CANADIAN INDUSTRIAL GAS & OIL LTD., 640 Eighth Avenue SW., Calgary, Alta.

Metals: Copper, silver.

Description:

The upper part of Kitselas Mountain is underlain by a sequence of volcanic rocks which occupy a complexly folded area transected by a northwest-striking fault (*see* Fig. 22).

The oldest rocks, mapped previously as being of Permian age (*Geol. Surv., Canada*, Map 1136A), comprise a sequence of grey cataclasites derived from rhyolite-dacite crystal-lithic tuffs and breccias. The pronounced directional fabric in these metavolcanic rocks is imparted by white to dark-grey 2-millimetre to 2-centimetre crystal and lithic fragments elongate in the plane of foliation, and by streaks of secondary quartz which locally give the rock a banded appearance. The matrix of these rocks is made up largely of fine-grained quartz, sericite, carbonate, and minor biotite. Two varieties of these metavolcanic rocks are differentiated by fragment size; one with centimetre size and larger fragments, and a finer variety with tuff size fragments. A buff-coloured rock, designated on Figure 22 as felsite, represents bleaching and pyritization of the finer grained grey crystal tuffs adjacent to the major northwest fault zone.

Cutting the metavolcanic rocks are basic dykes, now mainly fine-grained biotite schists of basaltic andesite composition. The dykes are 2 to 5 feet wide and are best exposed in trenches in the A and B mineralized zones where they occur in swarms. The dykes, which are fine grained and dark green, commonly have chilled borders and disseminated pyrite is a common constitutent in the mineralized zones. Two dyke directions were noted, striking east-northeast and northwest, and dipping steeply north or vertical.

Apparently overlying the metavolcanic rocks unconformably are massive basalts and basaltic andesites. These rocks include apple-green to dark-grey flow breccias

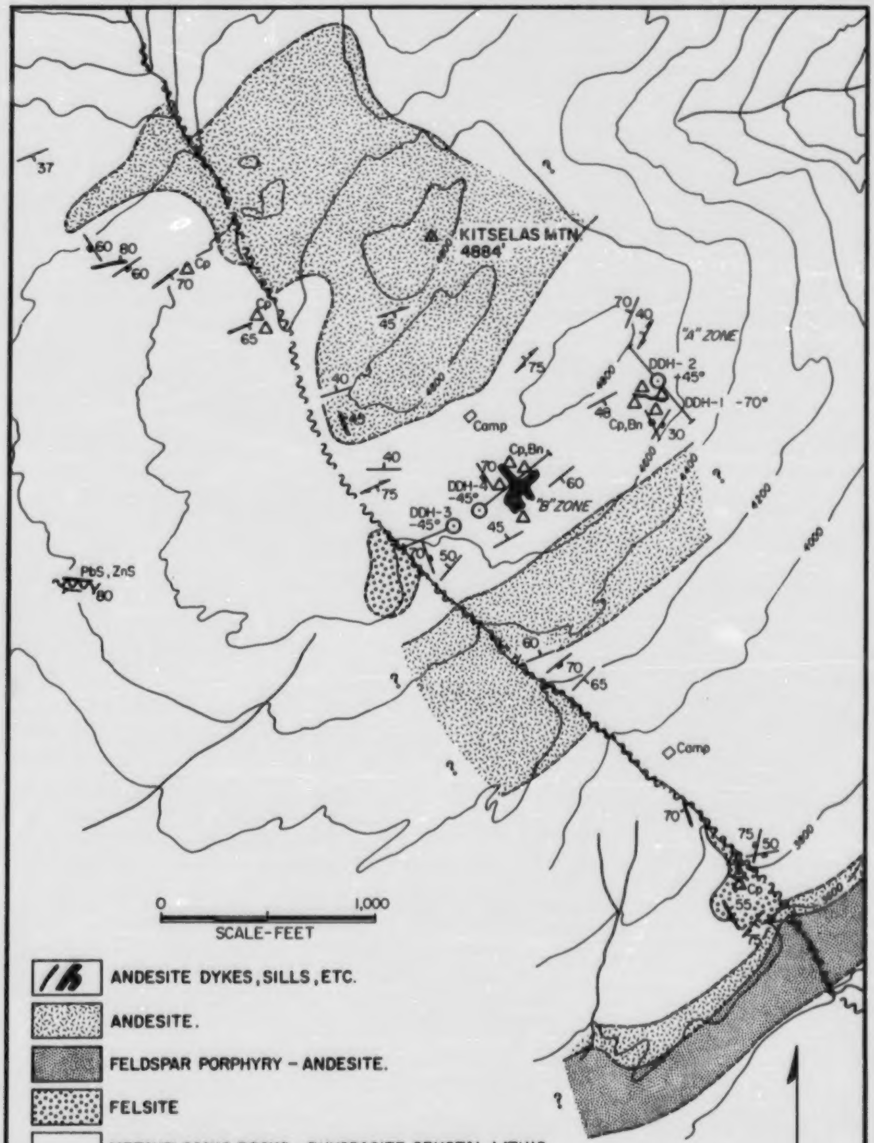

KITSELAS MTN
4884'
"A" ZONE
"B" ZONE
DDH-1 -70°
DDH-2 +45°
DDH-3 -45°
DDH-4 -45°
Camp
Camp
Cp
Cp,Bn
PbS, ZnS
4800
4600
4400
4200
4000
3800
0
1,000
SCALE-FEET
ANDESITE DYKES, SILLS, ETC.
ANDESITE.
FELDSPAR PORPHYRY - ANDESITE.
FELSITE
METAVOLCANIC ROCKS - RHYODACITE CRYSTAL LITHIC TUFFS AND BRECCIAS.
BEDDING, BANDING.
SCHISTOSITY
FAULTS, SHEAR ZONES
AREA OF TRENCHES
Cp,Bn,PbS, ZnS CHALCOPYRITE, BORNITE, GALENA, SPHALERITE.
-N-
TOPOGRAPHY FROM COMPANY PLANS

Figure 22. Geology of part of the Gold Star, Rob, and DB claims, Kitselas Mountain area.

and purple tuff breccias and, because of their lack of directional fabric and less indurated nature, are thought to be younger than both the metavolcanic rocks and basic dykes which cut them.

A medium-green feldspar porphyry of andesite composition occurs in a sill-like body at 3,600 feet elevation on the southeast slope of Kitselas Mountain. Between 40 and 50 per cent of the rock is composed of randomly oriented stubby to bladed 1 to 2-centimetre phenocrysts of unzoned plagioclase (oligoclase) which occur in a fine-grained matrix of plagioclase, chlorite, epidote, and magnetite. The feldspar porphyry body may have been a feeder for the previously described massive flow rocks.

Massive, fine-grained, magnetic, hornblende diorite dyke rocks were noted adjacent to the northwest fault southwest of the mineralized zones and may represent the youngest rocks.

Two zones of copper-silver mineralization, referred to as the A and B zones, which occur around 4,700 feet elevation south and west of Kitselas Mountain summit, have been explored by trenching and diamond drilling (*see* Fig. 22). Chalcopyrite, bornite, and probably tetrahedrite occur as blebs and stringers in the plane of foliation in the metavolcanic rocks of the A zone, but, more commonly, mineralization is confined to closely spaced northeast and northwest vertical fractures and shear planes. In the B zone, very fine-grained copper-silver mineralization occurs along the margins of, and adjacent to, basic dykes.

Two samples were collected from the A zone, including one taken across 25 feet in a north-south direction which assayed: Silver, 0.8 ounce per ton; copper, 0.64 per cent; lead and zinc, trace. A chip sample collected over an 80-foot-long east-trending trench assayed: Silver, 0.6 ounce per ton; copper, 0.77 per cent; lead and zinc, trace.

A number of trenches southeast of the A and B zones, at an elevation of 3,800 feet, expose felsitic rocks containing disseminated pyrite and minor chalcopyrite on fractures.

Minor chalcopyrite mineralization was noted west of Kitselas summit, in metarhyolites adjacent to basic dykes. On the west slope of the mountain, at an elevation of 4,400 feet, an old adit was driven along a 2 to 3-foot-wide east-striking shear in which a 6-inch to 1-foot wide quartz vein contains galena, sphalerite, chalcopyrite, and magnetite. A 5-foot-wide basic dyke parallels the shear.

The four drill holes put down in 1970 intersected only sparse mineralization, mainly in and adjacent to dykes of biotite schist. Drill hole 3 (*see* Fig. 22) crossed the northwest fault zone, intersecting metavolcanic rocks altered to sericite schist in which the original fragmental texture is all but obliterated.

WORK DONE: Topography and underground workings surveyed; surface geological mapping, 1 inch equals 400 feet covering 25 claims; geochemical silt and water survey, approximately 428 samples covering all claims; geochemical orientation rock survey, approximately 13 samples on DB 1; trenching, 650 and 370 feet on DB 1 claim and 400 feet on Rob 21 Fraction; surface diamond drilling, four holes totalling 1,860 feet on DB 1 claim.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 76, 77; Assessment Reports 999, 1090, 1961, 2365, 2719.

CARIBOO MINING DIVISION

GISCOME

NORTH BEND, ADA (No. 17, Fig. E)

LOCATION: Lat. 54°16′ Long. 122°21′ (93J/8W)
At approximately 2,300 feet elevation, 38 miles north-northeast of Prince George, on north shore of Fraser River.

CLAIMS: NORTH BEND 1 to 10, ADA (Lot 8447).

ACCESS: By boat from Prince George.

OWNER: CENTRAL B.C. EXPLORATION LTD., 1726 West 14th Avenue, Vancouver 9.

METAL: Tungsten.

WORK DONE: Tunnel on Ada claim surveyed; surface geological mapping, 1 inch equals 3,000 feet; road construction, one-quarter mile; trenching, 20 by 5 by 200 feet on North Bend 2 and 60 by 3½ by 200 feet on North Bend 1.

REFERENCE: *Minister of Mines, B.C.,* Ann. Rept., 1935, p. C30.

WET, MM (No. 29, Fig. E)

LOCATION: Lat. 54°13′ Long. 121°58′ (93I/4W)
At approximately 2,400 feet elevation, on Mine Creek, a tributary of McGregor River, 8 miles north of Upper Fraser.

CLAIMS: WET 1 to 51, 53 to 70; MM 9 to 21; DEL 1, 2; FRAN 1 to 5; RUZ 1 to 8.

ACCESS: By road or boat from McGregor, 11 miles.

OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Scattered chalcopyrite and pyrite in silicified shear zone in argillite and limestone.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on all claims; electromagnetic survey, 8 line-miles covering Wet 23, 24, 48, 55, 59, 61, Del 1 and 2, Fran 2, and MM 1 to 4; geochemical soil survey, 219 samples covering the same claims.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1956, p. 30; Assessment Report 2759.

SAMSON, TIN, CAN (No. 18, Fig. E)

LOCATION: Lat. 54°04′ Long. 122°20′ (93J/1W)
At approximately 2,300 feet elevation, 30 miles east-northeast of Prince George, at Giscome.

CLAIMS: SAMSON 1 to 36, TIN 1 to 14, CAN 1 to 40, JHG 1 to 10, ELSA Fraction.

ACCESS: By road from Giscome.

OWNER: CENTRAL B.C. EXPLORATION LTD., 1726 West 14th Avenue, Vancouver 9.

METALS: Silver, lead, zinc.

WORK DONE: Claim survey; surface geological mapping; geochemical soil and silt survey, 1,655 samples covering JHG, Samson, and Tin claims; road construction, one-half mile; trenching, 10 by 6 by 200 feet on Samson 2; stripping, 6 by 40 by 250 feet on Samson 15.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 150; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 160.

TASPAI CREEK

LOON (No. 28, Fig. E)

LOCATION: Lat. 53°50′ Long. 122°05′ (93G/16E)
At approximately 4,000 feet elevation, on Taspai Creek, 3 miles northwest of Spring Mountain and 14 miles east-southeast of Prince George.

CLAIMS: LOON 1 to 16, FU-HU 1 to 48, STP 1 to 5, 25, 26, 43 to 92.

ACCESS: By road from Prince George, 25 miles.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Pyrrhotite, pyrite, malachite, and minor chalcopyrite accompanied by propylitic alteration in metasediments and metavolcanics of the Slide Mountain Group, intruded by Jurassic or later porphyritic quartz monzonite.

WORK DONE: Electromagnetic survey, 11 line-miles; induced polarization and resistivity survey, 6 line-miles; geochemical soil survey, 167 samples covering Loon 1 to 16, FU-HU 9, 11 to 14; surface diamond drilling, four holes totalling 1,158 feet on Loon 13 and 14.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 160; Assessment Reports 1633, 1952, 2615.

BOBTAIL MOUNTAIN

RAY (No. 42, Fig. E)

LOCATION: Lat. 53°38′ Long. 123°28′ (93G/11W)
On the southwest flank of Bobtail Mountain, just east of Naltesby Lake.

CLAIMS: RAY 1 to 24, 27 to 42.

ACCESS: By four-wheel-drive vehicle from Highway 16, approximately 50 miles west of Prince George.

OWNER: ENSBROOK MINES LTD., 34, 448 Seymour Street, Vancouver 2.

METAL: Nickel.

DESCRIPTION: Widely spaced chrysotile veinlets containing nickel silicates occur in portions of a large ultrabasic mass.

WORK DONE: Magnetometer survey, geochemical survey, trenching.

REFERENCE: Assessment Report 2557.

STONEY LAKE

ROQ (No. 43, Fig. E)

LOCATION: Lat. 53°25–27′ Long. 121°56–59′ (93H/5W)
Near the southwest shore of Stoney Lake.

CLAIMS: ROQ 1 to 56.

ACCESS: By road 31 miles northeast from Strathnaver.

OPERATOR: CONTINENTAL McKINNEY MINES LIMITED, 506, 540 Burrard Street, Vancouver 1.

DESCRIPTION: Scattered mineralization has been found along the contact between diorite and andesitic volcanic rocks.

WORK DONE: Magnetometer survey.

REFERENCE: Assessment Report 2313.

STRATHNAVER

ICE (No. 7, Fig. E)

LOCATION: Lat. 53°19–21′ Long. 122°20–23′ (93G/8W)
At approximately 3,000 feet elevation, on Naver Creek, 10 miles east-northeast of Strathnaver.

CLAIMS: ICE, totalling 56.

ACCESS: Ten miles east from Strathnaver by road.

OWNER: CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.

METAL: Molybdenum.

DESCRIPTION: Molybdenite occurs in granodiorite intruding volcanic rocks.

WORK DONE: Magnetometer survey, 20 line-miles; and geochemical soil survey, 500 samples covering all claims.

JO (No. 8, Fig. E)

LOCATION: Lat. 53°20′ Long. 122°25–27′ (93G/8W)
At approximately 3,000 feet elevation, 1 mile west of Yardley Lake.

CLAIMS: Fifty-five JO.

ACCESS: By road from Quesnel, 40 miles.

OWNER: CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.

METAL: Copper.

DESCRIPTION: Chalcopyrite occurs in sheared andesite.

WORK DONE: Electromagnetic survey, 8 line-miles on JO 1 to 8.

MOUSE MOUNTAIN

W, WANDA (No. 9, Fig. E)

LOCATION: Lat. 53°02–05′ Long. 122°20′ (93G/1W)
At approximately 3,300 feet elevation, on Mouse Mountain, 14 miles due east of Quesnel.

CLAIMS: W 1 to 69, WANDA 1 to 20, five fractions.

ACCESS: By road from Quesnel, 14 miles.

OPERATOR: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

METALS: Copper, silver.

DESCRIPTION: Disseminated chalcopyrite and tetrahedrite occur in altered volcanic and intrusive rocks.

WORK DONE: Percussion drilling, seven holes totalling 1,400 feet on Wanda 5 to 8.

M (No. 6, Fig. E)

LOCATION: Lat. 53°02′ Long. 122°21′ (93G/1W)
At approximately 2,300 feet elevation on Mouse Mountain.

CLAIMS: M, totalling 41.

ACCESS: Five miles east from Quesnel by road.

OWNER: CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.

METAL: Copper.

DESCRIPTION: Chalcopyrite in gabbro intruding volcanic rocks.

WORK DONE: Induced polarization survey, 20 line-miles; magnetometer survey, 20 line-miles; and geochemical soil survey, 500 samples covering all claims.

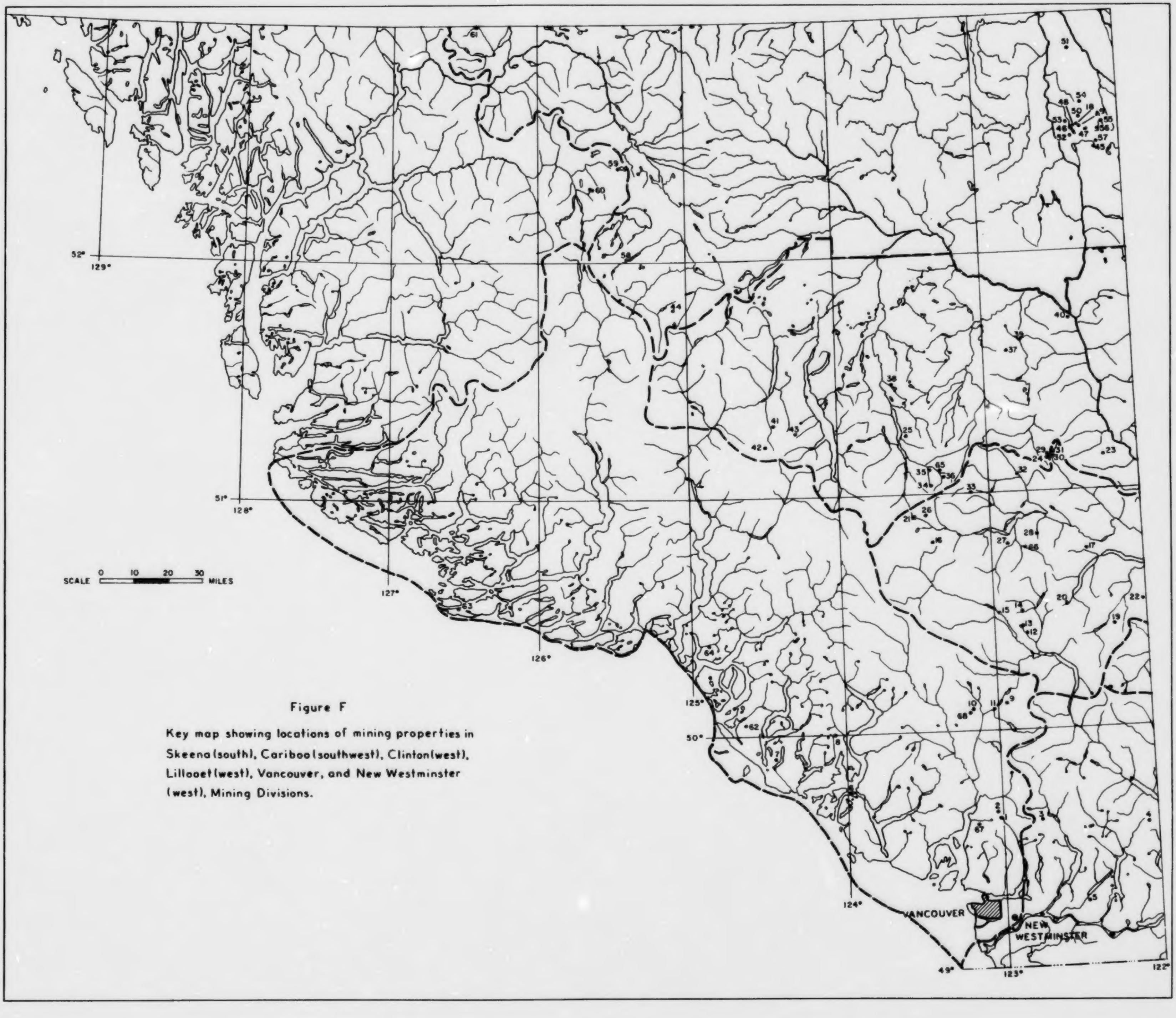

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Figure F

Key map showing locations of mining properties in Skeena (south), Cariboo (southwest), Clinton (west), Lillooet (west), Vancouver, and New Westminster (west), Mining Divisions.

WELLS

AURUM MINE (No. 37, Fig. E)

By W. G. Clarke

LOCATION: Lat. 53°06.2′ Long. 121°34.8′ (93H/4E)
On the east side of Island Mountain, at Wells.

ACCESS: Fifty-five miles by road east from Quesnel.

OWNER: THE CARIBOO GOLD QUARTZ MINING COMPANY LIMITED, 617 West Pender Street, Vancouver 2.

METAL: Gold.

WORK DONE: There was no work at the mine, which remained closed. The company did some exploration and staking in the Ahbau Lake region.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1967, p. 121; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 162.

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4 KF, page 246.
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9 AZURE, page 232.
10 CALLAGHAN, TARN (ASTRA, CAMBRIA), page 230.
11 ELK, page 231.
12 OWL, OC, KB, page 227.
13 J, page 226.
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15 N, TEXAS, page 226.
16 R, EE (SAL, SALAL), page 223.
17 LUBRA, page 225.
18 GIBRALTAR MINE, page 205.
19 A, page 227.
20 ROCK, page 226.
21 BR, page 222.
22 INDEX, page 227.
23 GB, page 216.
24 COPPER, PM, GIANT, CHEAP, page 216.
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26 GRISWOLD (RUSSNOR), page 223.
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65 TEEK, page 214.
66 BRALORNE MINE, page 225.
67 BRITANNIA MINE, page 233.
68 VAN, SUNNY CAVE, page 231.

TWEEDSMUIR PARK

BOOM, WILF (No. 61, Fig. F)

LOCATION: Lat. 52°57.5′ to 53°01′ Long. 126°24–30′ (93D/16W, 93E/1W)
At 4,100 feet elevation, on the west side of Ramsey Creek, 45 miles north-northeast of Bella Coola (in Tweedsmuir Park).

CLAIMS: BOOM 1 to 82, WILF 1 to 18.

ACCESS: By helicopter from Bella Coola, 45 miles.

OWNER: KERR ADDISON MINES LTD., 405, 1112 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Pyrite, chalcopyrite, and molybdenite occur in quartz veins and fractures in hornfelsed Hazelton volcanics and in quartz diorite and quartz monzonite intrusions.

WORK DONE: Surface diamond drilling, three holes totalling 544 feet on Boom 21 and 52.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 150; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 161, 162.

McCLINCHY LAKE

KF (No. 58, Fig. F)

LOCATION: Lat. 52°01′ Long. 125°23′ (93C/3W)
At the southwest end of McClinchy Lake, at 4,000 feet elevation.

CLAIMS: KF 1 to 23.

ACCESS: By aircraft from Nimpo Lake, 22 miles.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METAL: Copper.

DESCRIPTION: Chalcopyrite and minor bornite occur in quartz stringers in granodiorite and quartz diorite.

WORK DONE: Induced polarization survey, 9 line-miles covering KF 1 to 23.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 162.

PERKINS PEAK

MOUNTAIN BOSS (APEX, MOUNTAIN KING) (No. 44, Fig. F)

LOCATION: Lat. 51°48′ Long. 125°05′ (92N/14E)
At approximately 7,000 feet elevation on Perkins Peak, 22 miles west-southwest of Tatla Lake Post Office.

CLAIMS: APEX 1 to 54 located claims and the Crown-granted claims BELCHOR 1 to 8 (Lots 1063 to 1070), BRITON (Lot 1062), IRON CROWN No. 7 (Lot 1071), MONARCH (Lot 1076), HEATHER (Lot 1083), BLUE BELL (Lot 1084).

ACCESS: From Williams Lake–Bella Coola highway by 18 miles of new road.

OWNER: KLEENA KLEENE GOLD MINES LTD., 826, 470 Granville Street, Vancouver 2.

METALS: Gold, silver, copper.

DESCRIPTION: Arsenopyrite stringers, veinlets, and patches occur in an extensive silicified zone in sedimentary rocks. A small quartz diorite stock, 1,000 feet in diameter, outcrops about three-quarters of a mile southeast of the main showings.

Work done: Approximately 91 line-miles of airborne magnetic, electromagnetic, and radiometric surveys; 18 miles of access roads constructed.

References: *Minister of Mines, B.C.*, Ann. Repts., 1938, pp. F38–F41; 1945, p. 82; *Geol. Surv., Canada*, Sum. Rept., 1925, Pt. A, p. 162; Assessment Report 2540.

KERSLEY

BUG (No. 51, Fig. F)

Location: Lat. 52°50.5′ Long. 122°19′ (93B/16E)
At 3,500 feet elevation, 3 miles south-southeast of Dragon Mountain.

Claims: BUG 1 to 75.

Access: From Kersley by road, 5 miles.

Owner: NICANEX MINES LTD., 821, 602 West Hastings Street, Vancouver 2.

Work done: Geochemical soil and stream sediment survey, 300 samples.

References: Assessment Reports 296, 2656.

McLEESE LAKE

BM (No. 54, Fig. F)

Location: Lat. 52°37.5′ Long. 122°15.5′ (93B/9E, 9W)
Eleven miles northeast of Marguerite Post Office, at 3,500 to 4,350 feet elevation.

Claims: BM 3, 4, 9 to 17, 22, 23, 25, 27 to 32.

Access: By dirt and jeep road, 20 miles from McLeese Lake.

Owner: ARGONAUT MINES LTD., 1710, 1177 West Hastings Street, Vancouver 1.

Work done: Chain and compass survey of key claims and reconnaissance geological and geochemical surveys.

Reference: Assessment Report 2480.

BIT, GMM, BREN (No. 50, Fig. F)

Location: Lat. 52°32–35.5′ Long. 122°11–20′ (93B/9E, 9W)
The property is centred approximately 7 miles east-northeast of Marguerite Post Office, at elevation 3,600 feet.

Claims: BIT, GMM, BREN, BUN, HL, RUM, RYE, TAK, totalling 458.

Access: From McLeese Lake by road, 12 miles.

Owner: McLeese Lake Copper Mines Ltd.

Operator: CANEX AERIAL EXPLORATION LTD., 800 Burrard Building, Vancouver 5.

Metal: Copper.

Work done: Claims and topography mapped; induced polarization survey, 88.4 line-miles; surface diamond drilling, 11 holes totalling 3,912 feet on Bit and GMM claims.

References: Assessment Reports 296, 1029, 1796, 2736.

NAIL (No. 53, Fig. F)

Location: Lat. 52°33′ Long. 122°22′ (93B/9W)
The property is centred 4½ miles northeast of Marguerite Post Office, at about 3,000 feet in elevation.

Claims: NAIL 1 to 20.

Access: By the Mooresheads Ranch road, 5 miles from Marguerite Post Office.
Owner: CHAPPARAL MINES LTD., 428, 470 Granville Street, Vancouver 2.
Work done: Ten and one-half line-miles of magnetometer survey.
Reference: Assessment Report 2304.

KEN (No. 52, Fig. F)

Location: Lat. 52°28′ Long. 122°19′ (93B/9W)
One mile west of the south end of Cuisson Lake, at approximately 3,000 feet elevation.

Claims: KEN 1 to 8, 10, 12 to 20.
Access: By secondary roads, 5 miles from McLeese Lake.
Owner: NORCAN MINES LTD., 675 West Hastings Street, Vancouver 2.
Work done: Approximately 21 line-miles of magnetometer survey.
Reference: Assessment Report 2253.

G, H (No. 46, Fig. F)

Location: Lat. 52°30.3′ Long. 122°20′ (93B/8W, 9W)
The property is centred one-half mile southwest of Indian Reserve 12 at the north end of Cuisson Lake, at 3,000 feet elevation.

Claims: G 1 to 10, H 11 to 16.

Access: From McLeese Lake by road, 15 miles.

Operator: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, molybdenum.

Description: Chalcopyrite and molybdenite are disseminated in granodiorite which intrudes volcanics and small sections of limestone.

Work done: Induced polarization survey, 11 line-miles and magnetometer survey, 14 line-miles covering all claims; road construction, 1 mile (drill hole location access); surface diamond drilling, four holes totalling 2,023 feet on H 12 and G 3, 4, 8.

References: Assessment Reports 296, 903, 1150.

JAN, SUMMIT (No. 48, Fig. F)

Location: Lat. 52°31.5′ Long. 122°19′ (93B/9W)
At 3,600 feet elevation, approximately 5 miles east-northeast of Marguerite Post Office.

Claims: Eight SUMMIT, five JAN.

Access: From McLeese Lake by road, 10 miles.

Owner: Coast Silver Mines Ltd.

Operator: CANEX AERIAL EXPLORATION LTD., 800 Burrard Building, Vancouver 5.

Metals: Copper, molybdenum.

Work done: Topography mapped; surfaced diamond drilling, 21 holes totalling 11,306 feet on Summit claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 171, 173; Assessment Report 1796.

GIBRALTAR MINE (No. 18, Fig. F)

By W. G. Clarke

Location: Lat. 52°31′ Long. 122°17′ (93B/9W)
On Granite Creek and Granite Lake.

Claims: Total of 911 recorded mineral claims; 520 of these are held by option agreements with McLeese Lake Copper Mines Ltd., Coast Silver Mines Ltd., and Gunn Mines Ltd.

Access: From McLeese Lake–Likely road along Cuisson Lake road to Granite Creek, thence by mine road up Granite Creek and to Granite Lake.

Owner: CANEX AERIAL EXPLORATION LTD., 800 Burrard Building, 1030 West Georgia Street, Vancouver 5.

Metals: Copper, molybdenum.

Work done: Diamond drilling, 84,072 feet in 163 holes. Eight miles of road was built. A topographic map was made. The overburden was stripped on the Zephyr claims. A millsite was cleared on the GG claims. Altogether approximately 650 acres was logged and cleared and 510,000 cubic yards of overburden was removed. A temporary transformer station was installed to supply power during construction work.

References: *Geol. Surv., Canada,* Map 12-59; *Minister of Mines, B.C.,* Ann. Repts., 1957, p. 14; 1966, p. 121; 1967, p. 121; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 162–174.

POLLYANNA (No. 49, Fig. F)

Location: Lat. 52°31′ Long. 122°16.3′ (93B/9W)
At 3,600 feet elevation, 6½ miles slightly north of east of Marguerite Post Office.

Claims: Seventy GG, two HT Fractions, three RUM Fractions.

Access: From McLeese Lake by road, 11 miles.

Operator: CANEX AERIAL EXPLORATION LTD., 800 Burrard Building, Vancouver 5.

Metals: Copper, molybdenum.

Description: *See Geology, Exploration, and Mining in British Columbia,* 1969, pages 169, 171.

Work done: Topography mapped; stripping to clear millsite; surface diamond drilling, 32 holes totalling 13,783 feet; underground diamond drilling, four holes totalling 1,174 feet on the GG claims.

References: *Minister of Mines, B.C.,* Ann. Repts., 1917, p. 133; 1925, p. 155; 1928, p. 197; 1950, p. 106; 1957, p. 17; 1966, p. 124; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 169, 171, 173; Assessment Report 296.

HD (No. 47, Fig. F)

Location: Lat. 52°30.2′ Long. 122°13.6′ (93B/8E, 8W, 9E, 9W)
At 4,000 feet elevation, approximately 1 mile east of the south end of Granite Lake.

Claims: HD, HA, HAS, FFE, CAROL, VE, LINDA, totalling approximately 50.

Access: From McLeese Lake by road, 12 miles.

Owner: Gunn Mines Ltd.

Operator: CANEX AERIAL EXPLORATION LTD., 800 Burrard Building, Vancouver 5.

Metals: Copper, molybdenum.

Description: *See Geology, Exploration, and Mining in British Columbia,* 1969, page 172 (Gunn zone).

Work done: Claims and topography mapped; surface diamond drilling, 22 holes totalling 12,464 feet on HD claims.

References: *Minister of Mines, B.C.,* Ann. Repts., 1967, p. 121; 1968, p. 151; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 172, 174; Assessment Reports 1641, 1680A, 1680B, 2425 (line-cutting).

DOLLY, LINDA, CAROL (No. 55, Fig. F)

Location: Lat. 52°30.5–32′ Long. 122°06–09′ (93B/9E)
The property is centred at the south end of Philemon Lake, at an altitude of approximately 3,000 feet.

Claims: DOLLY 1 to 6, 21 to 26, 41 to 46, 75 to 80; LINDA 1 to 6, 9 to 40; CAROL 1 to 6.

Access: East via the McLeese Lake–Likely road and north by farm road to the east side of the property. Eight miles of road has been built on the property.

Operator: ARDO MINES LTD., 621, 602 West Hastings Street, Vancouver 2.

Work done: Thirty line-miles each of geochemical and magnetometer surveys.

Reference: Assessment Report 2696.

ACADIAN, BARNEY (No. 56, Fig. F)

Location: Lat. 52°28.5–31.5′ Long. 122°06–10′ (93B/8E, 8W)
The property is centred 2½ miles southwest of Philemon Lake, at about 3,500 feet elevation.

Claims: ACADIAN 1 to 40; BARNEY 1 to 22; DOLLY 7 to 20, 27 to 40, 47 to 74; D 1 to 24; SUE 1, 2; NOA 1, 2.

Access: East via the McLeese Lake–Likely road and north via several summer roads.

Operator: CITEX MINES LTD., 630, 890 West Pender Street, Vancouver 1.

Work done: Approximately 23 line-miles of geochemical and magnetometer surveys.

Reference: Assessment Report 2440.

CUB (No. 57, Fig. F)

Location: Lat. 52°25–27′ Long. 122°06–11′ (93B/8E)
Six miles east of McLeese Lake village, at 3,000 to 3,500 feet elevation.

Claims: CUB 1 to 60.

Access: Via the McLeese Lake–Likely road and, at a point 5 miles east of McLeese Lake, southward via the Tyee Lake road. This road traverses the property from northwest to southeast.

Owner: RONRICO EXPLORATIONS LTD., 448 Seymour Street, Vancouver 2.

Work done: Approximately 57 line-miles of magnetometer survey.

Reference: Assessment Report 2504.

VISTA, LELA, REX (TYEE) (No. 45, Fig. F)

Location: Lat. 52°22–27′ Long. 122°04–12′ (93B/8E)
At approximately 3,200 feet elevation, 6 miles east of McLeese Lake.

Claims: VISTA, LELA, REX, DIANE, totalling approximately 250.

Access: From McLeese Lake by road, approximately 10 miles.

Operator: TYEE LAKE RESOURCES LTD., 312, 510 West Hastings Street, Vancouver 2.

Work done: Preliminary claim survey; surface geological mapping, 1 inch equals 1,320 feet on Diane claims; induced polarization survey, 5 line-miles covering Diane 1 to 10; road construction, 3 miles at headwaters of Sheridan Creek; surface diamond drilling, four holes totalling 1,253 feet on Lela 91, Vista 2, 11, and 38.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 175; Assessment Reports 2550, 2551, 2694.

ROUNDTOP MOUNTAIN

BON, PARK, ROUND TOP (No. 202, Fig. H)

Location: Lat. 52°56′ Long. 121°20′ (93A/14W)
From 2,600 to 3,500 feet elevation between Nugget and Roundtop Mountains.

Claims: BON, PARK, ROUND TOP, SILVER MT., RT, BASE METAL, and others.

Access: From Barkerville by road, 13½ miles.

Owner: COAST INTERIOR VENTURES LTD., 534, 789 West Pender Street, Vancouver 1.

Metals: Gold, silver, lead, copper, zinc, tungsten.

Description: Mineralization occurs in quartz veins and in shears generally close to faults that cut members of the Snowshoe and Midas Formations plunging northwest.

Work done: Road construction, about 1 mile; trenching, approximately 3,000 feet on Park 5, 11, 12 and RT 44.

SLIDE MOUNTAIN

LEM (No. 191, Fig. H)

Location: Lat. 52°40.4–46.3′ Long. 121°53.5′ to 122°03.5′ (93A/12W, 13W, 93B/9E)
At Twenty Mile Pass, 18 miles northwest of Likely.

Claims: LEM 1 to 320.

Access: By road 50 miles from Quesnel via the Gravelle ferry road.

Owner: LEM EXPLORATIONS LTD., Box 8682, Station H, Vancouver 5.

Metal: Copper.

Work done: Geological and geochemical mapping.

SLIDE, RIVER (No. 192, Fig. H)

Location: Lat. 52°37.2–43.7′ Long. 121°48.7–59.2′ (93A/12W)
Astride Quesnel River and on Slide Mountain, 40 miles southeast of Quesnel.

Claims: SLIDE, RIVER, totalling 408.

Access: By four-wheel-drive vehicle from Quesnel, 40 miles.

Owner: NIPPON MINING OF CANADA LTD., 607, 475 Howe Street, Vancouver 1.

Metal: Copper.

Description: Chalcocite disseminations and veinlets in dolomitic limestone.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on 33 claims; induced polarization and magnetometer survey, 19.5 line-miles covering 33 claims; geochemical soil survey, 2,150 samples covering 25 claims.

REFERENCES: Assessment Reports 2857, 2858, 2859.

LIKELY

CARIBOO-BELL (BOOTJACK) (No. 193, Fig. H)

LOCATION: Lat. 52°33.5′ Long. 121°38.5′ (93A/12E)
At approximately 3,200 feet elevation surrounding Bootjack Lake, 5 miles southwest of Likely.

CLAIMS: BJ, GREEN, RED, BLUE, HAZE, AXE, HOT, totalling 320.

ACCESS: From Williams Lake by gravel road, 50 miles.

OWNER: Cariboo-Bell Copper Mines Limited.

OPERATOR: LEITCH MINES LIMITED, 700, 1177 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Chalcopyrite occurs as disseminations, streaks, and veinlets, in places and to depth oxidized to chrysocolla, covellite, cuprite, and malachite. Mineralization is related to breccias in multi-intrusive dioritic stock of Jurassic or Cretaceous age intruding Lower Jurassic andesites.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet on BJ claims; induced polarization survey, 75 line-miles covering BJ, Red, Blue, and Green claims; geochemical soil survey, 3,000 samples covering all claims; percussion drilling, 56 holes totalling 17,225 feet on BJ, Red, Blue, and Green claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 176.

GAVIN, WET (No. 194, Fig. H)

LOCATION: Lat. 52°30′ Long. 121°45′ (92A/5E, 5W, 12E, 12W)
At approximately 3,500 feet elevation, surrounding Gavin Lake, 12 miles southwest of Likely and 25 miles east of McLeese Lake.

CLAIMS: GAVIN 1 to 18, WET 1 to 48.

ACCESS: From 150 Mile House by road, 35 miles.

OPERATOR: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite, pyrite, and molybdenite occur in a quartz vein stockwork associated with a swarm of quartz monzonite porphyry dykes which intrude a volcanic siltstone and basalt sequence.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; ground magnetometer survey, 51.5 line-miles; and geochemical soil survey, 1,368 samples covering all claims; road construction, 7 miles of tractor access roads; trenching, 3,305 feet on Gavin 1 to 8 and Wet 26 and 27.

REFERENCES: Assessment Reports 2445, 2733.

BEAVER LAKE

WIZ (No. 195, Fig. H)

LOCATION: Lat. 52°26.3′ Long. 121°56.9′ (93A/5W)
At approximately 3,000 feet elevation, 5 miles southwest of the settlement of Beaver Lake, about 22 miles north of 150 Mile House.

Claims: WIZ, totalling 47.

Access: From Williams Lake by road, 45 miles.

Owner: CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.

Metal: Copper.

Work done: Induced polarization survey, 20 line-miles; magnetometer survey, 40 line-miles; and geochemical soil survey, 1,000 samples covering all claims.

KID 77 (No. 198, Fig. H)

Location: Lat. 52°17.1′ Long. 121°56.5′ (93A/5W)
At approximately 3,000 feet elevation, near Skulow Lake, about 12 miles north of 150 Mile House.

Claims: KID 77 and 7 COME 11, totalling 92.

Access: By road from Skulow Lake, 1½ miles.

Owner: PEEL RESOURCES LIMITED, 703, 535 Thurlow Street, Vancouver 5.

Metal: Copper.

Work done: Airborne magnetometer survey, 107.2 line-miles covering Kid 77 1 to 50 and 7 Come 11 1 to 42 claims; geochemical survey, 98 samples covering Kid 77 2, 3, 17, 19 and 7 Come 11 1 to 4 claims.

MIOCENE

WIGGINS CREEK (No. 199, Fig. H)

Location: Lat. 52°17′ Long. 121°43′ (93A/5E)
At approximately 3,500 feet elevation, 20 miles northeast of Williams Lake, at Miocene.

Claims: WIGGINS CREEK 1 to 18; LUCKY DAWN 1 to 4; SANDRA 1 to 3; NANCY 1, 2; MABEL 1; HEARTS CONTENT 1, 2.

Access: From 150 Mile House by road, 18 miles.

Owner: GRANDEUR MINES LTD., 24, 448 Seymour Street, Vancouver 2.

Metal: Copper.

Description: The most extensive rock type found throughout the property is a dark-green trachyte porphyry containing abundant euhedral feldspar phenocrysts.

Work done: Surface geological mapping, 1 inch equals 400 feet on all claims; magnetometer survey, approximately 30 line-miles covering 30 claims; geochemical soil survey, 400 samples covering 12 claims; trenching with a D-7 tractor for 1 week.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 176; Assessment Report 2475.

QUESNEL LAKE

LYNDA (No. 196, Fig. H)

Location: Lat. 52°27.5′ Long. 121°28.2′ (93A/6W)
At approximately 3,000 feet elevation, 1½ miles south-southwest of Mitchell Bay, Quesnel Lake, near Shiko Lake, 9 miles north-northwest of Horsefly.

Claims: LYNDA 1 to 16.

Access: From Horsefly by road.

Owner: KERR ADDISON MINES LTD., 405, 1112 West Pender Street, Vancouver 1.

Metal: Copper.

Description: Pyritized volcanic rocks have been intruded by diorite and syenite. Chalcopyrite occurs weakly disseminated in the pyritized rocks and along syenite dykes that cut the diorite.

Work done: Surface geological mapping, 1 inch equals 200 feet on Lynda 1, 2, 4, 6, and 11; magnetometer survey, 4½ line-miles covering Lynda 2, 4, and 6; geochemical soil survey, 80 samples covering Lynda 2, 4, and 6.

HORSEFLY

FLY (No. 197, Fig. H)

Location: Lat. 52°21′ Long. 121°15′ (93A/6W, 6E)
At approximately 3,000 feet elevation, at Lemon Lake, 6 miles east-northeast of Horsefly.

Claims: FLY 1 to 40, SEN 1 to 6.

Access: From Horsefly by road, 7 miles.

Owner: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

Metal: Copper.

Description: Chalcopyrite and pyrite occur disseminated in a feldspathized contact zone between intrusive and volcanic rocks.

Work done: Surface geological mapping, 1 inch equals 400 feet on Sen 1 to 6; induced polarization survey, 10 line-miles; geochemical soil survey, 1,100 samples covering Sen 1 to 6 and Fly 25 to 30; stripping, 7,000 square feet on Fly 25 and Sen 3.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 177; Assessment Report 2779.

BIG TIMOTHY MOUNTAIN

BOSS MOUNTAIN MINE (No. 200, Fig. H)

By E. Sadar

Location: Lat. 52°05.9′ Long. 120°54.4′ (93A/2W)
At the head of Molybdenite Creek, on the east slope of Big Timothy (Takomkane) Mountain, about 6 miles west of Hendrix Lake.

Claims: Ninety-four claims, including 11 Crown-grants.

Access: By road from 100 Mile House via Forest Grove for 57 miles.

Owner: BRYNNOR MINES LIMITED (Boss Mountain Division), Hendrix Lake.

Metal: Molybdenum (*see* Table 1 for production).

Work done:

	Feet
Drifts and crosscuts	1,745
Raises	2,472
Subdrifts	2,820
Diamond drilling, underground	1,410
Diamond drilling, surface	3,119
Long blast-hole drilling	232,600
	Cubic Feet
Shaft stations and pockets	25,250

Concentrate was shipped to Great Britain and France. The company employed 232.

On the 550-volt distribution system, 250 M.C.M. cable was installed and the overhead power lines were rerouted. A permanent signalling system was installed in the shaft. A 2/0 A.W.G. grounding cable was installed in the shaft and the equipment grounds on each level were connected to it.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 152; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 178.

SILVER BOSS, GUS, SB (No. 200, Fig. H)

LOCATION: Lat. 52°06′ Long. 120°56′ (93A/2W)
Between 6,000 and 7,000 feet elevation, on top of Big Timothy (Takomkane) Mountain, 25 miles southeast of Horsefly.

CLAIMS: SILVER BOSS 1 to 24, GUS 1 to 14, SB 25 to 48.

ACCESS: From 100 Mile House by road, 75 miles.

OWNER: EXETER MINES LIMITED, 1010, 789 West Pender Street, Vancouver 1.

METALS: Copper, silver.

DESCRIPTION: Veins and disseminations of chalcopyrite, bornite, gold, sphalerite, and galena occur in shears in granodiorite and related rocks overlain by olivine basalt.

WORK DONE: Surface geological mapping, 1 inch equals 800 feet on all claims; electromagnetic survey, 35.5 line-miles covering Silver Boss 1 to 24, SB 29 to 31, 33, 34, 37, 38, and Gus 1 to 6, 8 to 14; geochemical survey, 231 samples covering same claims as the electromagnetic survey.

REFERENCE: Assessment Report 2513.

EUREKA MOUNTAIN

CS, EN (No. 201, Fig. H)

LOCATION: Lat. 52°18–21′ Long. 120°36–42′ (93A/7E)
Eureka Mountain, between Crooked Lake and MacKay River in upper Horsefly River drainage basin, 32 miles east of Horsefly, at elevation 5,000 to 7,900 feet.

CLAIMS: CS, EN, totalling 84.

ACCESS: From Horsefly by secondary and bush roads, 40 miles eastward.

OPERATOR: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Chalcopyrite, pyrite, and pyrrhotite are associated with a granodiorite stock intrusive into Mesozoic augite porphyry, amphibolite, and siltstone on the eastern edge of the Quesnel Trough.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet, and geochemical soil, silt, water, and rock chip survey, 222 samples covering all the claims; trenching, approximately 100 feet on EN 2 and 4.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 177; Assessment Report 2662.

CLINTON MINING DIVISION

TATLAYOKO LAKE

BEN (No. 41, Fig. F)

LOCATION: Lat. 51°18.3′ Long. 124°24.9′ (92N/8W)
At 6,500 feet elevation, approximately 25 miles due south of Tatlayoko Lake Post Office, a mile east of Nostetuko River.

CLAIMS: BEN 1 to 143.

ACCESS: From Tatlayoko Lake Post Office by helicopter, 25 miles.

OPERATOR: PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur in fractures and quartz veins in granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on all claims; detailed surface geological mapping, 1 inch equals 200 feet on Ben 30, 32, 34, 36 to 40, 77, 79, 81, and 83.

REFERENCE: Assessment Report 2670.

BLUE (No. 42, Fig. F)

LOCATION: Lat. 51°13.2′ Long. 124°29.4′ (92N/1W, 8W)
At 7,500 feet elevation, approximately 32 miles south-southwest of Tatlayoko Lake Post Office, at the western headwaters of Nostetuko River.

CLAIMS: BLUE 1 to 84.

ACCESS: From Tatlayoko Lake Post Office by helicopter, 32 miles.

OPERATOR: PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Molybdenite, chalcopyrite, and bornite occur in quartz veins in granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on all claims; detailed surface geological mapping, 1 inch equals 200 feet on Blue 33 to 36.

REFERENCE: Assessment Report 2669.

RUM (No. 43, Fig. F)

LOCATION: Lat. 51°16′ Long. 124°17.3′ (92N/1W, 8W)
Between 6,500 and 8,000 feet elevation, approximately 30 miles south-southeast of Tatlayoko Lake Post Office, at the headwaters of Tredcraft Creek.

CLAIMS: RUM 1 to 96.

ACCESS: From Tatlayoko Lake Post Office by helicopter, 30 miles.

OPERATOR: PACIFIC PETROLEUMS LTD., 408, 580 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur disseminated and in quartz veins in quartz diorite.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on all claims.

REFERENCE: Assessment Report 2671.

TASEKO LAKES

BB (FISH LAKE, VICCAL-MARY STUART) (No. 38, Fig. F)

LOCATION: Lat. 51°27.8′ Long. 123°37.5′ (92O/5E)
One mile northwest of Fish Lake, at 4,800 feet elevation.

CLAIMS: BB, BJ, BF, BT, BW, totalling 158.

ACCESS: From Williams Lake, approximately 110 miles by road, or by float plane to Fish Lake.

OWNER: National Trust Co. Ltd.

OPERATOR: NITTETSU MINING CO. LTD., 404, 470 Granville Street, Vancouver 2.

METALS: Copper, gold, silver.

DESCRIPTION: Pyrite, chalcopyrite, magnetite, and pyrrhotite occur as disseminations and on fracture planes in intensely altered dioritic feldspar porphyry.

WORK DONE: Approximately 9 line-miles of detailed induced polarization survey on claims BB 24 to 28 and 41 to 48.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1935, pp. 28, 29; 1961, p. 24; 1962, p. 21; 1968, p. 154; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 180; Assessment Reports 369, 2483, 2702.

BANNER (CHITA) (No. 25, Fig. F)

LOCATION: Lat. 51°15.2′ Long. 123°32′ (92O/4E, 5E)
At approximately 7,000 feet elevation, about 2 miles east of Lower Taseko Lake and 2 miles north of Chita Creek.

CLAIMS: BANNER 1 to 80, BANNER 1 Fraction.

ACCESS: From Williams Lake by road, 125 miles.

OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Disseminated chalcopyrite occurs within altered quartz feldspar porphyry.

WORK DONE: Road construction, 5 miles within claim block boundaries; percussion drilling, 21 holes totalling 4,200 feet on Banner 1 to 8, 10, 12, 14, 16, 18, and 45 to 48.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1962, p. 21; 1968, p. 154; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 180; Assessment Reports 473, 551, 1606.

TASEKO, SPOKANE (No. 35, Fig. F)

LOCATION: Lat. 51°04–07′ Long. 123°20–28′ (92O/3W)
Between 5,300 and 7,000 feet elevation, approximately 7 miles southeast of Lower Taseko Lake, on Granite and Amazon Creeks and Taseko River.

CLAIMS: TASEKO, SPOKANE, SUMI, and many others, totalling 248.

ACCESS: From Williams Lake by road, 159 miles.

OWNERS: Scurry-Rainbow Oil Limited and National Nickel Company Limited.

OPERATOR: SUMITOMO METAL MINING CANADA LTD., 1022, 510 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Porphyry-type copper and copper-molybdenum deposits.

WORK DONE: Claims mapped in part; surface workings mapped; surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 110 line-miles; induced polarization survey, 100 line-miles; geochemical soil survey, 5,500 samples; geochemical rock survey, 250 samples; road construction, 26 miles (22 miles on property and 4 miles access); trenching, 3,550 feet; percussion drilling, 65 holes totalling 12,340 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1935, pp. F22–25; 1956, p. 35; 1968, p. 155; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 181; Assessment Reports 2134, 2226A, 2226B, 2364.

TEEK (No. 65, Fig. F.)

LOCATION: Lat. 51°06.5′ Long. 123°19′ (92O/3W)
Ten miles east-southeast of Upper Taseko Lake, between Battlement and Denain Creeks.

CLAIMS: TEEK 1 to 22.

OPERATOR: HAFUNO RESOURCES LTD., 1250, One Bentall Centre, Vancouver 1.

WORK DONE: Approximately 500 soil samples were collected and analysed for copper.

REFERENCE: Assessment Report 2803.

RH (MAD MAJOR, MM) (No. 36, Fig. F)

LOCATION: Lat. 51°02.5–05.5′ Long. 123°16.5–19′ (92O/3W)
At approximately 6,500 feet elevation, at the confluence of Griswold Creek and Taseko River.

CLAIMS: RH 1 to 132.

ACCESS: From Clinton, 70 miles by helicopter.

OWNER: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur in fractures in granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on RH 97 to 132; surface diamond drilling, five holes totalling 1,387 feet on RH 35, 37, and 102.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1919, p. 249; 1968, p. 155; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 181; Assessment Reports 552, 556, 1729.

BILL, NW (ROWBOTTOM) (No. 34, Fig. F)

LOCATION: Lat. 51°02.5′ Long. 123°22.5′ (92O/3W)
At 6,000 feet elevation, approximately 11 miles southeast of the south end of Taseko Lake, at the head of Granite Creek.

CLAIMS: BILL 1 to 18, NW 1 to 18, MOM 1 to 28, GR 1 to 62, 65 to 100.

ACCESS: From Williams Lake by road, 170 miles.

OWNER: VICTOR MINING CORPORATION LTD., 818, 510 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: The area is underlain by medium-grained quartz diorite of the Coast Range Batholith. The quartz diorite is extensively faulted in a north to north 20 degrees west direction. Pyrite and chalcopyrite occur on fracture planes and as disseminations over a large area.

WORK DONE: Surface workings mapped; preliminary surface geological mapping; road construction, 6 miles; trenching, 3,000 feet on NW 3 and 4; surface diamond drilling, two holes totalling 800 feet on NW 3 and 7.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 134; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 181.

CHILCOTIN RIVER

ML (No. 37, Fig. F)

LOCATION: Lat. 51°35′ Long. 122°49.5′ (92O/10W) Approximately 13 miles southeast of Big Creek Post Office, at about 5,500 feet elevation.

CLAIMS: ML 1 to 198.

ACCESS: From Williams Lake by helicopter, 50 miles.

OWNER: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

METAL: Copper.

DESCRIPTION: A porphyry-type deposit at a contact between hornblende granodiorite and biotite granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on ML 141 to 144; induced polarization survey, 12 line-miles covering ML 111 to 117 and 132 to 144.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 182, 183; Assessment Reports 2127, 2174, 2823, 2824.

KANE, ABLE, COLE (No. 39, Fig. F)

LOCATION: Lat. 51°36–42′ Long. 122°42–50′ (92O/10E, 10W) On Gaspard Creek, 20 miles west-northwest of the Gang Ranch, at 3,500 to 5,000 feet elevation.

CLAIMS: KANE 1 to 14, ABLE 3 to 12, COLE 1 to 12, JAKE 1 to 35, PEN 1 to 21, DON 1 to 15.

ACCESS: By road from the Gang Ranch.

OPERATOR: ADMIRAL MINES LTD., 550 Burrard Street, Vancouver 1.

WORK DONE: Approximately 120 line-miles of aeromagnetic survey.

REFERENCE: Assessment Report 2705.

CHILCO, SILVER (No. 40, Fig. F)

LOCATION: Lat. 51°43′ Long. 122°24′ (92O/9W) Immediately southwest of the confluence of the Chilcotin and Fraser Rivers, at 2,000 to 3,000 feet elevation.

CLAIMS: CHILCO 1 to 36, SILVER 2, 4, 9 to 12.

ACCESS: By road 49 miles south from Williams Lake, or by aircraft to an airstrip on the property.

OWNER: CHILCOTIN SILVER MINES LTD., 1250, One Bentall Centre, Vancouver 1.

WORK DONE: Approximately 16 line-miles of geochemical survey on the Chilco 5 to 7, 9, 11 to 18, 22 to 26 claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 182; Assessment Reports 1877, 2348.

POISON MOUNTAIN

HILL (No. 31, Fig. F)

LOCATION: Lat. 51°10′ Long. 122°30′ (92O/2E)
At approximately 5,500 feet elevation on the northeast slope of Poison Mountain.

CLAIMS: HILL 9 to 19, 23 to 40.

ACCESS: From Lillooet by road, 58 miles.

OWNER: BURLINGTON MINES & ENTERPRISES LTD., 818, 510 West Hastings Street, Vancouver 2.

METALS: Copper, antimony.

WORK DONE: Trenching, 3,500 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, p. 136; 1967, p. 128; Assessment Report 968.

COLT (No. 29, Fig. F)

LOCATION: Lat. 51°09.5′ Long. 122°36.5′ (92O/2E)
At approximately 6,000 feet elevation on Poison Mountain.

CLAIMS: COLT 1 to 8, COLT 1 Fraction.

ACCESS: From Lillooet by road, 60 miles.

OWNER: RALPH SOSTAD, 1025 Wildwood Lane, West Vancouver.

METAL: Antimony.

WORK DONE: Claims mapped; 600 feet of trenching on Colt 1 and 2.

COPPER, PM, GIANT, CHEAP (No. 24, Fig. F)

LOCATION: Lat. 51°08.2′ Long. 122°37.5′ (92O/2E)
At approximately 5,700 feet elevation on the west side of Poison Mountain.

CLAIMS: Approximately 180, including COPPER, PM, GIANT, CHEAP.

ACCESS: From Lillooet by road, about 60 miles.

OPERATORS: HOMESTAKE MINERAL DEVELOPMENT COMPANY, Old National Bank Building, Spokane, Wash. 99201, and CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.

METALS: Copper, molybdenum.

DESCRIPTION: Pyrite and chalcopyrite with some bornite, molybdenite, and magnetite occur as disseminations and fracture-fillings in biotite porphyry. The latter intrudes interbedded argillite, greywacke, and conglomerate.

WORK DONE: Induced polarization survey, 37 line-miles; magnetometer survey, 20 line-miles; geochemical soil survey, 500 samples covering all claims; surface diamond drilling, 18 holes totalling 9,044 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1946, p. 101; 1956, p. 35; 1961, p. 24; 1966, p. 136; 1967, p. 127; Assessment Reports 278, 411.

STIRRUP CREEK

GB (No. 23, Fig. F)

LOCATION: Lat. 51°08.5′ Long. 122°14′ (92O/1E)
Stirrup Creek area.

CLAIMS: GB 1 to 14, 16 to 21.

ACCESS: From Clinton by road, approximately 40 miles.

Owner: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

Metals: Mercury, antimony.

Work done: Geochemical soil survey, 35 samples covering GB 1, 2, and 10; geochemical rock-sampling survey, 11 samples covering GB 1, 2, 9, and 10.

LAC LA HACHE

OGDEN (No. 159, Fig. H)

Location: Lat. 51°52′ Long. 121°25′ (92P/14W)
Lac la Hache.

Claims: OGDEN 1 to 46.

Access: From Lac la Hache by road, 8 miles from Highway 97.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Description: The property is underlain mostly by Pleistocene glacial overburden and Tertiary volcanics. A few exposures of andesitic volcanics of Triassic(?) age were found at the southeast corner of the claim group. These contain some disseminated sulphides.

Work done: Surface geological mapping, 4 inches equal 1 mile; induced polarization survey, 4.8 line-miles; magnetometer survey, 4.8 line-miles; geochemical soil survey, 35 samples covering all claims.

DB (No. 158, Fig. H)

Location: Lat. 51°50–51′ Long. 121°22–25′ (92P/14W)
At Whitehorse Lake, 3½ miles northeast of the southeast end of Lac la Hache.

Claims: DB 1 to 40.

Access: From Lac la Hache by road, 8 miles from Highway 97.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Description: The area is underlain by Upper Triassic Nicola Group and Tertiary volcanic rocks and mantled by an extensive cover of Pleistocene glacial overburden.

Work done: Surface geological mapping, 4 inches equal 1 mile on all claims; induced polarization survey, 9.2 line-miles covering DB 2 to 40; magnetometer survey, 9.6 line-miles covering all claims; geochemical soil survey, 200 samples covering all claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 183; Assessment Report 2684; *Geol. Surv., Canada,* Map 3-1966.

SODA (No. 157, Fig. H)

Location: Lat. 51°47–50′ Long. 121°16–23′ (92P/14W)
On 111 Mile Creek, immediately northwest of Soda Lake and immediately north of Club Lake.

Claims: SODA 1 to 60, 100 to 142.

Access: From Highway 97 by 111 Mile Creek road, 5 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Description: The property is underlain mainly by Pleistocene glacial overburden. From the few outcrops observed, it seems that the southwest half of the property is underlain by Tertiary volcanics and the rest of the property by Triassic(?) andesites and limestones.

Work done: Surface geological mapping, 4 inches equal 1 mile; induced polarization survey, 11.7 line-miles; magnetometer survey, 11.7 line-miles; geochemical soil survey, 450 samples covering all claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 183; Assessment Report 2684; *Geol. Surv., Canada,* Map 3-1966.

70 MILE HOUSE

BD, VB, WIN (Dansey-Rayfield River) (No. 156, Fig. H)

By V. A. G. Preto

Location: Lat. 51°15–21′ Long. 121°04–08′ (92P/6E)
At 3,500 feet elevation, 13 miles east of 70 Mile House on the Rayfield River.

Claims: BD 29 to 84; VB 1 to 8, 10 to 61, 9 Fraction; WIN 1 to 14.

Access: By gravel secondary road and bush road from 70 Mile House, 17 miles.

Operator: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

Metal: Copper.

Description:

This property has been staked several times in recent years; at present the BD claims are held by C. W. Dansey, of Savona, and the VB and WIN claims by Amax Exploration, Inc.

Although the area is one of low, rolling upland with very sparse rock exposures, the deeply incised valley of the Rayfield River crosses the entire claim groups from north to south and provides an excellent and almost continuous geological section from Crater Lake to Bonaparte River (*see* Fig. 23).

The property has been described in considerable detail by Amax geologists in Assessment Report 2135, to which the reader is referred for more specific information. The present report and map are a slightly different interpretation of the geology by the writer, following a brief visit in June 1970.

Essentially the claims are underlain by a zoned syenitic pluton exposed along Rayfield River as a window in Miocene plateau basalts which surround it on all sides. The geology is shown on Figure 23. The area occupied by Rayfield River pluton is shown on Geological Survey of Canada Map 3-1966 to be one of the westernmost reaches of the Lower Jurassic Thuya Batholith as it disappears under an extensive cover of plateau basalts. The actual relationship between Rayfield River pluton and Thuya Batholith is not clear as the syenitic rocks cannot be traced directly into the predominantly quartz-bearing rocks of the batholith to the east. Because of the occurrence of one quartz porphyry dyke cutting syenite on the claims, it has been suggested (Assessment Report 2135, p. 9) that Rayfield River pluton might be older than Thuya Batholith. This is somewhat slender evidence, and the writer prefers to leave the question open until more conclusive information is obtained.

The succession of rocks along Rayfield River canyon has been said to outline a concentrically zoned pluton grading from diorite at its outer margin through amphibole syenite to a central zone of leucosyenite and syenite pegmatite (Assessment Report 2135). Though this writer essentially agrees with the geological map presented in the above report, it should be pointed out that, given the near lack of exposures outside the river canyon, the central zone of leucosyenite rather than being an oval body elongated in a northwesterly direction could be a much narrower body elongated in that direction and in turn cut near its centre by a roughly parallel dyke-like body of syenite pegmatite. Similarly, it is questionable whether the outer boundary of the amphibole syenite also follows a crudely circular outline.

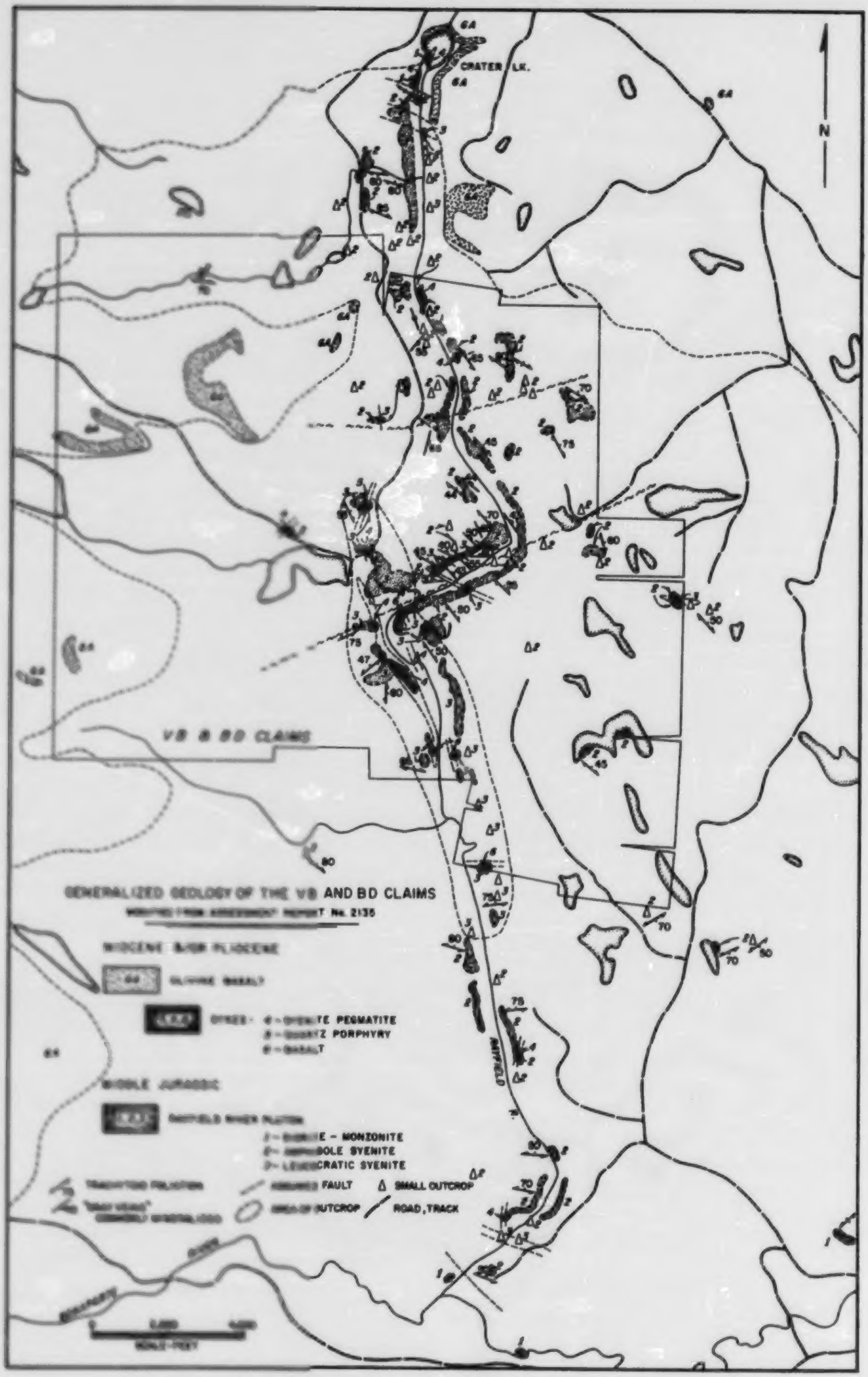

CRATER LK.
N
VB & BD CLAIMS
GENERALIZED GEOLOGY OF THE VB AND BD CLAIMS
MODIFIED FROM ASSESSMENT REPORT No. 2135
MIOCENE AND/OR PLIOCENE
OLIVINE BASALT
DYKES - 4 - SYENITE PEGMATITE
5 - QUARTZ PORPHYRY
6 - BASALT
MIDDLE JURASSIC
1 - DIORITE - MONZONITE
2 - HORNBLENDE SYENITE
3 - LEUCOCRATIC SYENITE
TRACHYTOID FOLIATION
"GASH VEINS" COMMONLY MINERALIZED
ASSUMED FAULT
SMALL OUTCROP
AREA OF OUTCROP
ROAD, TRACK
0
2,000
4,000
SCALE-FEET

Figure 23. Generalized geology of the VB and BD claims.

The following is a brief description of the main rock types which because of their composition and mutual relationships are believed to be genetically related and to form the various phases of the Rayfield River pluton.

Diorite is found in the vicinity of Crater Lake in the northern part of the area mapped, and in the southern part immediately north of Bonaparte River. Near Crater Lake the diorite is characteristically greenish grey, medium grained, and strongly broken. It contains 20 to 25 per cent mafic minerals, mostly amphibole extensively altered to biotite, and is typified by extensive sericite and epidote alteration. Near Bonaparte River the rock is typically coarser grained and strongly foliated. It contains nearly equal amounts of potash feldspar and of strongly sericitized plagioclase with about 20 per cent dark-green amphibole and olive-brown biotite, and is thus more properly termed a monzonite.

Amphibole syenite is the most abundant rock type in Rayfield River pluton. It is found in the northern and southern portions of the river canyon as well as in few sparse outcrops both east and west of the river. The rock is generally medium grey in colour, coarse grained, and well foliated. Its contact with the diorite phase, though never observed, is probably sharp, as exposures of syenite are found close to exposures of diorite and (or) monzonite both in the northern and southern parts of the area, and show no indication that the two phases grade into one another. Amphibole syenite is typically composed of 50 to 75 per cent microcline microperthite, 10 to 35 per cent sodic plagioclase, mostly as anhedral grains surrounded or partly replaced by perthite, 10 per cent green amphibole, generally extensively replaced by greenish biotite, and minor amounts of corroded pyroxene grains, sphene, apatite, garnet, muscovite, and magnetite.

Leucocratic syenite is found in the central part of the area mapped, as a narrow body elongated in a northwesterly direction. The northern part of this body appears to have sharp contacts with the amphibole syenite, and is flanked to the northeast by a number of dykes of similar composition and up to 20 feet in width, which clearly cut the amphibole syenite. Similar dykes also cutting the amphibole syenite are found elsewhere in the area mapped. In contrast, the southern part of the central body of leucosyenite has a poorly defined graditional contract with the surrounding amphibole syenite. The leucosyenite is typically very light grey to light pinkish grey in colour, medium to coarse grained, and commonly foliated. It consists almost wholly of microcline microperthite, with as much as 10 per cent anhedral grains of sodic plagioclase. Mafic minerals form up to 4 per cent of the rock and are green amphibole, extensively replaced by green biotite. Muscovite, garnet, and magnetite occur in trace amounts.

Syenite pegmatite and nepheline syenite pegmatite occur as numerous, generally small and irregular dykes which are found cutting both the amphibole syenite and the leucosyenite. The largest of these dyke-like bodies is roughly central to and parallel with the body of leucosyenite. Syenite pegmatite is grey or pinkish in colour, coarse to very coarse grained, and very leucocratic. It is generally composed almost wholly of microcline microperthite and (or) potash feldspar, and only minor amounts of green amphibole, olive-green biotite, muscovite, and sphene. Nepheline occurring as euhedral grains up to 1 centimetre across and weathering to a bluish-grey colour has been found in the northern part of the central pegmatite body and has been positively identified both by X-ray and in thin-section. Another pinkish pegmatite from the same general area is composed approximately 90 per cent of large crystals of microcline and 10 per cent of irregular angular patches of a soft, waxy green substance which in thin-section shows as fine-grained sericite.

Trachytoid foliation is fairly well displayed by all phases throughout Rayfield River pluton. In the central and northern parts of the area it trends northwesterly, with moderate to steep northeasterly dips. In the southern part of the area the foliation crudely outlines a curved trend which swings from northwesterly in the southwestern corner to approximately east-west in the south central part to northeasterly in the southeastern corner of the area. This trend might outline roughly the shape of the outer boundary of the amphibole syenite, but is not adequate in defining it for mapping purposes.

In the central part of the area, and especially in the amphibole syenite northeast of the body of leucosyenite, the trachytoid foliation is roughly paralleled by a great number of "grey veins," which commonly contain bornite, chalcopyrite, and rare chalcocite. Similar veins, though much less numerous, are also found in the leucosyenite. Dykes of fine-grained leucosyenite, which in this area cut the amphibole syenite, are crudely parallel to both the trachytoid foliation and the grey veins, and occasionally also contain sulphide-bearing veinlets. Individual veinlets may be as much as 1 centimetre wide and continuous for several scores of feet. In hand specimen they appear as a grey to dark-grey fracture in the rock, commonly with sulphides concentrated at the centre. In thin-section the veins are seen clearly to brecciate those crystals which they cross and to consist of finer grained, granular feldspathic material, epidote, sericite, garnet, and commonly sulphides. Of these minerals, the sulphides appear to be the only ones foreign to the host rock and are thus assumed to have been introduced.

Sulphide mineralization occurring both as disseminations and along "grey veins" has been found over a large area of Rayfield River pluton. Company reports speak of mineralization in excess of 0.05 per cent copper over an area 12,000 by 4,000 feet lying northeast of the leucosyenite phase, with a zone of +0.1 per cent copper measuring 7,000 by 2,000 feet lying within this area. In general, the better-grade mineralization occurs where grey veining is most strongly developed, but within the northern part of the body of leucosyenite, where "grey veins" are rare, appreciable sulphides occur disseminated throughout the rock. The following are values obtained from chip samples taken by the writer along trench or road cut walls, entirely within the northern portion of the leucosyenite body, and on both sides of Rayfield River. Braces indicate groups of contiguous samples.

Sample (No.)	Length (Ft.)	Copper (Per Cent)
1	45	0.05
2	45	0.02
3	45	0.01
4	50	0.01
5	50	0.08
6	50	0.05
7	50	0.11
8	50	0.04
9	50	0.12
10	50	0.04
11	50	0.14

Work done: Percussion drilling, 5,735 feet in 31 holes on the VB 4, 11, 13, 15 and BD 51, 53 to 62, 60 to 71, 73, 83.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 159; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 184; Assessment Reports 859, 1723, 2135.

VIDETTE LAKE

SEM, RL (No. 172, Fig. H)

LOCATION: Lat. 51°09′ Long. 120°48′ (92P/2W)
Vidette Lake.

CLAIMS: SEM 1 to 68, SEM 69 and 70 Fractions, RL 1 to 10.

ACCESS: From Savona by Vidette Lake road, 44 miles.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

DESCRIPTION: Large portions of the claim groups covered by a mantle of Pleistocene glacial debris. Other areas have outcrops of Triassic(?) andesites, dacites, hybrid andesites(?), and hornblende diorites. Disseminated sulphides in some of the volcanics.

WORK DONE: Surface geological mapping, 1 inch equals 600 feet on all claims; induced polarization survey, 13.4 line-miles; magnetometer survey, 13.4 line-miles; and geochemical soil survey, 360 samples covering Sem 1 to 68 and RL 1 to 10.

LERIC, TERNAN (No. 171, Fig. H)

LOCATION: Lat. 51°09′ Long. 120°44′ (92P/2W)
Vidette Lake.

CLAIMS: LERIC 1 to 42, TERNAN 1 to 20.

ACCESS: From Savona by Vidette Lake road, 55 miles.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

DESCRIPTION: Most of the area is covered by a mantle of Pleistocene glacial debris. Outcrops of Triassic-Jurassic(?) granodiorite, quartz diorite intrusive rock types, and Triassic(?) andesites and dacites were found (some disseminated pyrite).

WORK DONE: Surface geological mapping, 1 inch equals 600 feet on all claims; induced polarization survey, 7.7 line-miles; magnetometer survey, 7.7 line-miles; and geochemical soil survey, 425 samples covering Leric 1 to 40 and Ternan 1 to 20.

LILLOOET MINING DIVISION

UPPER BRIDGE RIVER

BR (No. 21, Fig. F)

LOCATION: Lat. 50°54′ Long. 123°30′ (92J/13E, 14W)
On Bridge River, 30 miles west of Gold Bridge, at 6,000 feet elevation.

CLAIMS: BR 1 to 46.

ACCESS: By helicopter, 40 miles from Pemberton Meadows or 60 miles from Alta Lake.

OWNER: CANEX AERIAL EXPLORATION LTD., 800, 1030 West Georgia Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Quartz-sericite alteration envelopes containing magnetite, bornite, chalcopyrite, pyrite, and malachite are well developed in quartz monzonite. The quartz monzonite is intruded by white feldspar porphyry sills which are in turn cut by diorite dykes.

WORK DONE: Reconnaissance geological mapping and 1½ line-miles of induced polarization survey.

REFERENCES: Assessment Reports 2499, 2500.

GRISWOLD (RUSSNOR) (No. 26, Fig. F)

Location: Lat. 50°54.5′ Long. 123°25.5′ (92J/14W)
At approximately 5,000 feet elevation, near the headwaters of Thunder Creek, a northern branch of Bridge River, 26 miles west of Gold Bridge.

Claims: RUSSNOR, RUSSNOR 2 to 4, MEL 1 to 36.

Access: By the Bridge River road to Lajoie Dam (east end of Downton Lake), by boat up Downton Lake and the Bridge River for 20 miles, then by foot trail 7 miles to the property, or by helicopter.

Owner: Thunder Creek Mines Ltd.

Operator: CERRO MINING COMPANY OF CANADA LIMITED, 401, 1111 West Georgia Street, Vancouver 5.

Metals: Copper, silver, gold, molybdenum.

Description: The region is underlain by Coast Range quartz diorites and related rocks. In the claim area these rocks have been intruded by a younger granite. Mineralization occurs in a fracture zone between the older and younger intrusives and consists of disseminations and small pods of chalcopyrite, bornite, and pyrite with minor amounts of molybdenite and gold-silver values. Malachite and azurite occur as alteration minerals.

Work done: Chip sampling; two short X-ray holes drilled near the adit.

References: *Minister of Mines, B.C.,* Ann. Repts., 1929, pp. 234, 235; 1930, p. 202.

R, EE (SAL, SALAL) (No. 16, Fig. F)

Location: Lat. 50°41.5–49′ Long. 123°21–31′ (92J/11W, 12E, 14W)
Between 4,500 and 8,100 feet elevation on Salal Creek, 42 miles northwest of Pemberton.

Claims: R 1 to 32, EE 1 to 49, PLUG 9 to 12, 19 to 24, BAT 1 to 16, BALL 1 to 16, BEST 1 to 116, BETA 1 to 74, BERG 1 to 40.

Access: From Pemberton Meadows by helicopter, approximately 30 miles.

Owners: Salal Molybdenum Mines Limited and Cerro Mining Company of Canada Limited.

Operator: CERRO MINING COMPANY OF CANADA LIMITED, 401, 1111 West Georgia Street, Vancouver 5.

Metal: Molybdenum.

Description: Differentiated leucocratic granitic stock intrudes Coast Range complex. Molybdenite occurs within the stock in dry veins, joint coatings, and in veins with quartz and pyrite. Alteration weak, locally moderate to strong.

Work done: Topography mapped; surface geological mapping, 1 inch equals 500 feet on Bat, Ball, EE, R, and Plug claims; geochemical silt and talus survey, 163 samples covering EE, R, Plug, Bat, and Ball claims; geochemical rock chip survey, 54 samples covering EE, Plug, and Bat claims.

References: *Minister of Mines, B.C.,* Ann. Repts., 1961, p. 28; 1964, p. 84; 1966, p. 140; Assessment Reports 709, 2741.

GUN CREEK

TRIGGER (COPPER MOUNTAIN, GUN CREEK) (No. 33, Fig. F)

Location: Lat. 51°00.3′ Long. 123°07.5′ (92O/3E)
Between 6,500 and 7,000 feet elevation on Copper Creek, 20 miles up Gun Creek from Minto.

CLAIMS: TRIGGER, TRIGGER 2 to 4.

ACCESS: From Gold Bridge by helicopter, 17 miles.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Pyrite, chalcopyrite, magnetite, quartz, and calcite occur as fracture-fillings in brecciated and fractured granodiorite.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 2.75 line-miles; induced polarization survey, 1 line-mile; and geochemical soil survey, 54 samples covering all claims.

REFERENCES: *Geol. Surv., Canada,* Sum. Repts., 1918, Pt. B, p. 25; 1928, Pt. A, p. 88; Assessment Report 2553.

TYAUGHTON CREEK

MUGWUMP, HONDA, WINDFALL (No. 32, Fig. F)

LOCATION: Lat. 51°04′ Long. 122°48′ (92O/2W)
At approximately 5,000 feet elevation on Relay Creek, 1½ miles above Tyaughton Creek.

CLAIMS: MUGWUMP, MUGWUMP 2 to 14, MUGWUMP 1 to 6 Fractions, HONDA 1 to 6, WINDFALL 1 to 3 Fractions.

ACCESS: From Gold Bridge by road, 25 miles.

OWNER: BALLINDERRY EXPLORATIONS LTD., 1108, 1111 West Hastings Street, Vancouver 1.

METAL: Mercury.

DESCRIPTION: Cinnabar with associated stibnite occurs in fractures in Fergusson conglomerate.

WORK DONE: Trenching, approximately 2,100 feet, and stripping, 200 by 50 feet, on Mugwump, Mugwump 2 to 4, and Mugwump 4 Fraction.

POISON MOUNTAIN

REWARD (No. 30, Fig. F)

LOCATION: Lat. 51°10′ Long. 122°30′ (92O/2E)
At approximately 6,000 feet elevation on the southeast slope of Poison Mountain.

CLAIMS: REWARD 1 to 17, 19 to 26.

ACCESS: From Lillooet by road, 54 miles.

OWNER: RALPH SOSTAD, 1025 Wildwood Lane, West Vancouver.

METAL: Copper (in float).

WORK DONE: Claims and surface workings mapped; 1,000 feet of trenching on Reward 9 and 10.

BRALORNE

STIBNITE (LOST GOLD) (No. 27, Fig. F)

LOCATION: Lat. 50°46.5′ Long. 122°52.7′ (92J/15W)
At approximately 3,000 feet elevation, 4,000 feet south-southwest of Gwyneth Lake.

CLAIMS: STIBNITE 1 to 4.

ACCESS: From Bralorne by road, 5 miles.

OWNER: THUNDER CREEK MINES LTD., Box 466, Lillooet.

Metal: Antimony.

Description: Stibnite occurs in a 2-foot wide shear zone in Hurley River greenstone.

Work done: Trenching.

References: *Minister of Mines, B.C.*, Ann. Rept., 1960, p. 24; Assessment Report 332.

BRALORNE MINE (No. 66, Fig. F)

By E. Sadar

Location: Lat. 50°46′ Long. 122°48′ (92J/10W, 15W)
On Cadwallader Creek, 5 miles south of Gold Bridge.

Claims: One hundred and forty-nine claims, comprising the Bralorne group.

Access: On Lillooet-Bralorne road, 70 miles west of Lillooet.

Owner: BRALORNE CAN-FER RESOURCES LIMITED, 355 Burrard Street, Vancouver 1; mine office, Box 367, Bralorne.

Metal: Gold (*see* Table 1 for production).

Work done: Normal mining operations.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 187.

TRUAX (SPRUCE) (No. 28, Fig. F)

Location: Lat. 50°49′ Long. 122°42′ (92J/15E)
At approximately 6,000 feet elevation, near the headwaters of Truax Creek.

Claims: TRUAX 1 to 20.

Access: From Gold Bridge by road, 17 miles.

Owner: DAWSON RANGE MINES LTD., Box 466, Lillooet.

Metals: Gold, antimony.

Description: Stibnite occurs in a shear zone in Bridge River metasediments and gold is associated with arsenopyrite in three parallel quartz veins.

Work done: Trenching and stripping.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1960, p. 24.

ANDERSON LAKE

LUBRA (No. 17, Fig. F)

Location: Lat. 50°45.3′ Long. 122°22.3′ (92J/16W, 9W)
At approximately 6,000 feet elevation on Nosebag Mountain, 5 miles northwest of Seton Portage.

Claims: LUBRA 1 to 23.

Access: From Lillooet by helicopter, 20 miles.

Owner: UNION CARBIDE CANADA MINING LTD., 601, 1112 West Pender Street, Vancouver 1.

Metals: Tungsten, molybdenum.

Description: Scheelite, powellite, molybdenite, garnet, and sulphide-bearing skarn dykes in grey crystalline Permian limestone lenses.

Work done: Topography mapped; surface geological mapping, 1 inch equals 400 feet on Lubra 1 to 4, 6, 7, and 12 to 16; geochemical soil survey, 38 samples covering Lubra 1 to 4.

Reference: Assessment Report 2509.

ROCK (No. 20, Fig. F)

Location: Lat. 50°31.8′ Long. 122°31.2′ (92J/10E)
Approximately 1 mile northwest of Divine station, at 1,500 feet elevation.

Claims: ROCK 1 to 10.

Access: By logging-road, 2 miles north from Highway 99 at a point 1 mile northeast of Divine station.

Owner: DEMSEY MINES LTD., 510, 890 West Pender Street, Vancouver 1.

Work done: Reconnaissance geological mapping and trenching.

Reference: Assessment Report 2685.

PEMBERTON

GIN (No. 14, Fig. F)

Location: Lat. 50°30′ Long. 122°49′ (92J/7W, 10W)
At approximately 6,000 feet elevation, 13 miles in a straight line almost due north of Pemberton.

Claims: GIN 1 to 16.

Access: From Pemberton by helicopter, 13 miles.

Owner: UNION CARBIDE CANADA MINING LTD., 601, 1112 West Pender Street, Vancouver 1.

Metals: Tungsten, copper, zinc.

Description: Pyrrhotite-pyroxenite lens in Upper Triassic metavolcanics, both of which are in contact with post-Triassic granitic rocks of the Coast Range Batholith.

Work done: Topography mapped; surface geological mapping, 1 inch equals 50 feet on Gin 1 to 16; trenching, approximately 100 feet on Gin 4 to 6.

N, TEXAS (No. 15, Fig. F)

Location: Lat. 50°29.3′ Long. 122°43.5′ (92J/7E, 10E)
At approximately 2,000 feet elevation, at the south end of Birkenhead Lake.

Claims: N 1 to 4, 59 TEXAS, FLO 1, 2; PEN 1, 2.

Access: By road, 5 miles north from Highway 99.

Operator: MALIBU METALS LTD., 428, 510 West Hastings Street, Vancouver 2.

Metals: Copper, gold, silver, iron.

Work done: Surface workings mapped; trenching and stripping cleaned up.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 189.

J (No. 13, Fig. F)

Location: Lat. 50°25.8′ Long. 122°49.8′ (92J/7W)
On the northeast side of Owl Lake, at approximately 4,000 feet elevation.

Claims: J 27 to 34, 60 to 67.

Access: From Pemberton by helicopter, or by 7 miles of gravel road to Owl Creek, then 5½ miles of steep dirt road to Pine Lake Mining Company's drill camp, and 3½ miles by trail to Owl Lake.

Owner: J. A. CHAMBERLAIN.

Description: Pyrite occurs disseminated, and, in areas of heavy alteration, on fracture planes and as small stringers, in andesitic volcanic rocks.

Work done: Reconnaissance soil-sampling and geological mapping.

Reference: Assessment Report 2624.

OWL, OC, KB (No. 12, Fig. F)

LOCATION: Lat. 50°22.7–23.8′ Long. 122°45.4–47.8′ (92J/7E, 7W)
Showings at elevations 2,500, 2,700, and 3,700 feet, north of Pemberton on Owl Creek, from power-line at highway to Owl Lake.

CLAIMS: OWL, OC, KB, OL, OLS, OLN, OCS, BO, totalling 146.

ACCESS: From Pemberton by road, 7 miles.

OWNER: PINE LAKE MINING CO. LTD., 717, 402 West Pender Street, Vancouver 3.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite, molybdenite, and pyrite with minor magnetite and bornite occur as disseminations, blebs, and fracture-fillings in quartz diorite, feldspar porphyry, and dioritized volcanic rocks.

WORK DONE: Topography mapped; induced polarization survey, 3 line-miles covering OL 1 to 4 and OLN 6; surface diamond drilling, two holes totalling 1,296 feet on KB 3 and 4.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1916, pp. 270–272; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 188; Assessment Reports 599, 2106.

DUFFEY LAKE

A (No. 19, Fig. F)

LOCATION: Lat. 50°25.5′ Long. 122°13′ (92J/8E)
Two and one-half miles east of the northeast end of Duffey Lake, at approximately 6,500 feet elevation.

CLAIMS: A 1 to 18.

OWNER: SETON LAKE MINES LTD., 814, 510 West Hastings Street, Vancouver 2.

WORK DONE: Approximately 15 line-miles of electromagnetic survey.

REFERENCE: Assessment Report 2618.

TEXAS CREEK

INDEX (No. 22, Fig. F)

LOCATION: Lat. 50°31.7′ Long. 122°00′ (92I/12W, 92J/9E)
At approximately 7,500 feet elevation, at the head of the north fork of Texas Creek.

CLAIMS: Thirteen Crown-granted claims: INDEX, GLOBE, LP Fraction, LAST CHANCE (Lots 1306 to 1310), LUCKY JACK Fraction (Lot 5016), LEGAL TENDER (Lot 5074), LYTTON Fraction, SUNSET, ASPIN, HOPE (Lots 5079 to 5081, 5083), CLONMEL No. 2 Fraction, OUTLET Fraction, ARMES Fraction (Lots 5111 to 5113), JIM 1 to 13 located claims.

ACCESS: From Lillooet by road, 25 miles.

OPERATOR: RAINBOW LAKE EXPLORATIONS LTD., Box 466, Lillooet.

METAL: Molybdenum.

DESCRIPTION: The property is underlain by an elliptical granitic stock in contact with metamorphosed sediments. The stock is approximately 1¾ miles long and a maximum of 3,000 feet wide, with the long axis running east-west. Mineralization, consisting of molybdenite and minor amounts of pyrite, occurs as lenses and masses along fractures with minor amounts disseminated in the rock. The strongest fracture system, associated with alteration in the west end of the stock, strikes at 070 degrees. The showings have been explored sporadically since 1916 when a shipment of 9 tons of sorted ore assaying 16 per cent molybdenite was reported.

WORK DONE: Thirteen miles of road up Texas Creek repaired.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1916, pp. 26, 272; 1949, p. 113; 1964, p. 84; 1965, p. 145; 1966, p. 140.

SALLUS CREEK

SALLUS (No. 68, Fig. H)

LOCATION: Lat. 50°45.5–48.7′ Long. 121°45.6–49.2′ (92I/13W)
At 1,400 to 6,500 feet elevation between Gibbs and Sallus Creeks, 9 miles northeast of Lillooet.

CLAIMS: SALLUS, CHUCK, ACE, GIBBS, HILL, SALLUS CREEK.

ACCESS: By road from Lillooet, 5 to 35 miles.

OWNER: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

METALS: Copper, molybdenum, gold, silver, zinc.

DESCRIPTION: Sulphide mineralization in 1 to 8-inch wide east-west trending quartz veins in quartz monzonite.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on Sallus 41 to 44, 46, 68 to 71, 74 to 77, 88, and 89; induced polarization survey, 9.7 line-miles covering Sallus 62, 64, 66, 68 to 71, 74, 76, 77, 88, 89 and Hill 1; geochemical soil and talus fines survey, 616 samples covering Sallus 1 to 24, 60 to 91, 119 to 124 and Sallus Creek 25 to 38, 41 to 52, 101 to 118; road construction, 4 miles; surface diamond drilling, three holes totalling approximately 1,000 feet on Sallus 116 and 117.

REFERENCE: Assessment Report 2429.

VANCOUVER MINING DIVISION

CRACROFT ISLANDS

LUCKY STRIKE, G (No. 63, Fig. F)

LOCATION: Lat. 50°33′ Long. 126°32′ (92L/10E)
At 50 feet elevation, on the north side of West Cracroft Island.

CLAIMS: LUCKY STRIKE, G 1 to 4, 16, 17.

ACCESS: From Campbell River by boat or plane, approximately 70 miles.

OPERATOR: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Chalcopyrite and bornite occur as disseminations and in shear zones in andesite.

WORK DONE: Surface workings mapped, surface geological mapping, 1 inch equals 200 feet on Lucky Strike and G 1 to 4 and 17; induced polarization survey, 1.7 line-miles covering G 1 to 4.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 190; Assessment Report 2695.

RAMSAY ARM

CAP, APRIL, CYNDIE, RAMSAY (No. 64, Fig. F)

LOCATION: Lat. 50°23′ Long. 124°51.5′ (92K/7W)
At 1,500 feet elevation, approximately 3 miles east of Quatam Bay in Ramsay Arm.

CLAIMS: CAP, APRIL, CYNDIE, RAMSAY, QUATAM, ELLEN, MORRISON, JONES, VL, OLIVER, AC, totalling 71.

ACCESS: By logging-road from Quatam Bay, 3 miles.

OPERATOR: NEWMONT MINING CORPORATION OF CANADA LIMITED, 1230, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Disseminated chalcopyrite, pyrite, and pyrrhotite occur mainly within a breccia pipe. Host rocks are all plutonic, chiefly quartz monzonite and quartz diorite.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 200, 400, and 800 feet; magnetometer and induced polarization survey, 6.6 line-miles covering Cap 1 to 4 and April 17, 19, and 21; geochemical soil survey, 296 samples covering Cap 1 to 4 and April 17, 19, and 21; surface diamond drilling, three holes totalling 2,410 feet on Cap 2.

THEODOSIA INLET

OK, IN (No. 62, Fig. F)

LOCATION: Lat. 50°02.8′ Long. 124°38.7′ (92K/2E)
At 3,000 feet elevation, 2 miles south of the east end of Theodosia Inlet.

CLAIMS: OK, IN, KYDIDLE Fractions, totalling 126.

ACCESS: From Powell River by four-wheel-drive vehicle, 20 miles.

OPERATOR: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Fracture controlled pyrite, chalcopyrite, and molybdenite occur in an alteration envelope surrounding a granite intrusion in granodiorite.

WORK DONE: Road construction, 4 miles on north part of grid; surface diamond drilling, five holes totalling 2,000 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, pp. 58, 59; 1968, p. 73; Assessment Reports 1573, 2594, 2595.

POWELL RIVER

NIC, BLUE JAY, GJ (No. 7, Fig. F)

LOCATION: Lat. 49°54.5′ Long. 124°27′ (92F/16W)
Between 1,000 and 1,500 feet elevation above the west side of Haslam Lake, 5 miles east-northeast of Powell River.

CLAIMS: NIC 1 to 4, BLUE JAY 1 to 8, GJ 1 to 24, KATHY 1 to 14, DOG 1 to 7.

ACCESS: From Powell River by road, 6 miles.

OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METALS: Molybdenum, copper.

DESCRIPTION: Molybdenite, chalcopyrite, pyrite, and specularite occur in fractures and in quartz veins in quartz diorite and granodiorite which show epidote, orthoclase, and chlorite alteration.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on most of the central claims; induced polarization survey, 9.25 line-miles covering GJ 1 to 24 and Blue Jay 1 to 8; magnetometer survey, 10.2 line-miles; geochemical soil survey, 279 samples covering GJ 1 to 24 and Blue Jay 1 to 8; road construction, one-half mile on Blue Jay 2 to 5 and Dog 7; trenching, 3,700 feet on Blue Jay 2, 3, and 8, and Dog 7; surface diamond drilling, four holes totalling 960 feet on Blue Jay 2 and 4.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1967, p. 59; 1968, p. 73; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 190; Assessment Reports 1864, 2411.

JERVIS INLET

LINDA, L, MOON, SUN (No. 8, Fig. F)

LOCATION: Lat. 50°00′ Long. 124°05′ (92F/16E, 92K/1E)
At the headwaters of Lois River, on the west side of Mount Diadem, at approximately 4,000 feet elevation.

CLAIMS: LINDA 1 to 4, 9 to 23, L 5 to 8, MOON 1 to 10, SUN 5 to 8, 10 to 22.

OPERATOR: TIGER SILVER MINES LTD., 230, 505 Burrard Street, Vancouver 1.

METALS: Copper, lead, zinc, gold, silver.

WORK DONE: A total of 306 soil samples were collected and a magnetometer survey was made over 5.7 line-miles on Linda and Moon claims.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1950, p. 172; 1965, p. 224; Assessment Report 2621.

RC (SKOOKUM) (No. 6, Fig. F)

LOCATION: Lat. 49°45.5′ Long. 123°59′ (92G/13W)
Near the northern tip of Sechelt Peninsula, 1 mile east of Earls Cove, at sea-level.

CLAIMS: RC 1 to 3, 5 to 8.

ACCESS: By boat from Secret Bay.

OPERATOR: BART MINES LTD., 890 West Pender Street, Vancouver 1.

METALS: Gold, silver.

DESCRIPTION: Pyrite, containing gold and silver, occurs in northeast-striking quartz-filled fractures in granodiorite. Mineralization also appears to be associated with basaltic dykes which are normal to the fractures.

WORK DONE: Five line-miles of electromagnetic survey on the RC 5 to 8 claims.

REFERENCES: *B.C. Dept. of Mines,* Bull. 39, p. 39; *Minister of Mines, B.C.,* Ann. Rept., 1961, p. 89; Assessment Report 2722.

ALTA LAKE

CALLAGHAN, TARN (ASTRA, CAMBRIA) (No. 10, Fig. F) By J. W. Robinson

LOCATION: Lat. 50°04–07′ Long. 123°09′ (92J/3E)
At approximately 4,000 feet elevation, 3 to 5 miles northwest of McGuire Station.

CLAIMS: CALLAGHAN; TARN 1 to 11; AL 1 to 4, 7 to 10; MIKE 1 to 6; BILL 1; ED 2; PGE 3; CPR 4.

ACCESS: By road from the Pemberton highway, 3.7 miles.

OPERATOR: BARKLEY VALLEY MINES LTD., 96—67th Street, Delta.

METALS: Copper, lead, zinc, silver, gold, antimony, tungsten (*see* Table 1 for production).

WORK DONE: The ore haul road was improved. An area for stockpiling and facilities for dumping were constructed near the highway. About 300 square feet of stripping was done. Approximately 9,400 tons of rock was quarried and approximately 350 tons of better mineralized rock was stockpiled. Three holes totalling 120 feet were diamond drilled.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 75; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 191; Assessment Reports 424, 1577.

VAN, SUNNY CAVE (No. 68, Fig. F)

LOCATION: Lat. 50°04′ Long. 123°08.5′ (92J/3E)
At 1,450 to 3,500 feet elevation, 1 to 5 miles north of Brandywine Falls.

CLAIMS: VAN 1 to 55, 57 to 90, SUNNY CAVE, SUNNY CAVE 1 to 28, PETER, STAR, and others, totalling 140 in all.

ACCESS: Twenty-six miles north from Squamish by the Squamish–Pemberton highway.

OWNER: Van Silver Explorations Ltd.

OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METALS: Gold, silver, copper, lead, zinc, tungsten.

DESCRIPTION: Pyrite, chalcopyrite, sphalerite, galena, and scheelite in veins and fracture-fillings in epidotized and chloritized metadiorite.

WORK DONE: Electromagnetic survey (JEM), 5.9 line-miles and electromagnetic survey (VLF), 3 line-miles on Sunny Cave 4 to 11; biogeochemical and geochemical soil surveys, 985 samples covering Sunny Cave 1 to 11; trenching, 35 by 4 by 6 feet on Van 45; stripping, 475 by 125 by 35 feet on Van 45 and 73 and Sunny Cave 2; underground work, 20 feet on Van 45 (reopened a short adit); percussion drilling, seven holes totalling 2,000 feet on Sunny Cave and Sunny Cave 1 to 4.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 191.

ELK (No. 11, Fig. F)

LOCATION: Lat. 50°05.9′ Long. 123°02′ (92J/3E)
At approximately 2,500 feet elevation, about 1 mile west-northwest of Jordan Lodge Station.

CLAIMS: ELK 17 to 24, 26, 33, 35, 37, 39, 41.

ACCESS: By road from Alta Lake, 3 miles.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Malachite, chalcopyrite, molybdenite, and pyrite occur in fractures and shears in granite which intrudes metavolcanics and metasediments. Rocks are sericitized, chloritized, and locally silicified.

WORK DONE: Surface diamond drilling, two holes totalling 1,013 feet on Elk 19.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 74; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 191, 192; Assessment Reports 756, 1562, 2432.

AZURE (No. 9, Fig. F)

Location: Lat. 50°05–08′ Long. 122°55.5–58.5′ (92J/2W)
Between 2,500 and 4,000 feet elevation on Fitzsimmons Creek, 2 miles east of Alta Lake.

Claims: AZURE 1 to 34, 36, 38, 40 to 51, 56, 59, 62 to 64, 74 to 84, 86 to 92, 102 to 115.

Access: From Alta Lake by road, 3 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Disseminated chalcopyrite and pyrite associated with quartz in schists. Sericitic and chloritic alteration.

Work done: Surface geological mapping, 1 inch equals 400 feet on all claims; induced polarization survey, 11 line-miles covering 27 claims; electromagnetic survey, 15.3 line-miles covering 32 claims; geochemical soil survey, 206 samples covering 26 claims.

References: *Minister of Mines, B.C.*, Ann. Repts., 1963, p. 95; 1964, p. 146; 1965, p. 223; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 192; Assessment Report 508.

SQUAMISH

INDIAN RIVER COPPER, McVICAR (No. 2, Fig. F)

Location: Lat. 49°39.5′ Long. 123°01′ (92G/11E)
At 4,000 feet elevation, at the headwaters of Stawamus River and the east branch of Raffuse Creek.

Claims: The Crown-granted claims HARDING, RAINSTORM, NOONDAY, MAMQUAM, SLIDE Fraction, GROUSE Fraction, CABIN Fraction, HEATHER, WHISTLER, LILY, VIOLET, ROSE (Lots 6152 to 6163), and the located claims INDIAN RIVER COPPER, SI, LILY, AGAPE, MAIN, DAL, totalling approximately 60.

Access: By road from Squamish, 8 miles.

Operator: CROYDON MINES LTD., 27th Floor, 1177 West Hastings Street, Vancouver 1.

Metals: Copper, lead, zinc.

Description: Granite, quartz diorite, and schist are traversed by a shear zone which is about 100 feet wide and strikes north-south.

Work done: Surface geological mapping, 1 inch equals 400 feet on all claims; electromagnetic survey, 38 line-miles covering all claims; geochemical soil survey, 160 samples; road construction, 5 miles; surface diamond drilling, six holes totalling 2,000 feet on the Whistler, Maine 2, and Agape 7 claims.

References: *Minister of Mines, B.C.*, Ann. Repts., 1937, p. F20; 1953, pp. 159–162; 1965, pp. 222, 223; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 193; Assessment Reports 2373, 2632.

BELL (BELLE) (No. 1, Fig. F)

Location: Lat. 49°37.8′ Long. 123°01′ (92G/11E)
At approximately 2,500 feet elevation, on the southwest side of Indian River, about 1 mile southeast of the pass between Indian and Stawamus Rivers.

Claims: BELL 1, 2, 5 to 7, 9, 17.

Access: By logging-road and trail or power-line tote-road from Squamish, 10 miles.

Owner: NEW JERSEY ZINC EXPLORATION COMPANY (CANADA) LTD., 905, 525 Seymour Street, Vancouver 2.

Metal: Copper.

Description: Chalcopyrite and some pyrite occur disseminated or as irregular lenses and masses in metasediments of the Goat Mountain Formation, about one-quarter mile east of the Coast Intrusives contact. Silicification usually accompanies the chalcopyrite, but pyrite may occur without silica.

Work done: Electromagnetic survey, 2.3 line-miles covering Bell 1, 2, and 17.

References: *Minister of Mines, B.C.*, Ann. Rept., 1917, p. 276; *Geol. Surv., Canada*, Mem. 158, p. 113; Assessment Report 2665.

HOWE SOUND

BRITANNIA MINE (No. 67, Fig. F)

By A. Sutherland Brown and J. W. Robinson

Location: Lat. 49°36.6′ Long. 123°08.5′ (92G/11E)

The Britannia mine is on the east side of Howe Sound, 40 miles by road north of Vancouver.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metals: Copper, zinc (*see* Table 1 for production).

Description:

Introduction

Sixty-six years of nearly continuous operations have not exhausted the ore reserves of the Britannia mine nor has study over that period revealed with certainty the structure or stratigraphy of the mine. Significant orebodies such as the 040 (No. 10) continue to be found and the potential for finding others is good. The geology of the mine has been carefully studied for much of the period of exploitation, and substantial records kept. Most of the available mine has been remapped and drill core relogged by Anaconda geologists since acquiring the property in 1963. In addition, elaborate geological and geochemical research projects have been conducted. However, as different interpretations of some aspects of the geology are still possible, it is obvious that the Britannia orebodies are a very complex geological situation.

The following description is primarily concerned with the surface geology of an area of the Britannia Shear Zone that is particularly well exposed. It was studied with the hope of rapidly acquiring an acquaintance with the geology of the mine. A total of four weeks in 1969 and 1970 were spent mapping the surface and visiting underground. The manager and geological staff of the mine extended every help, including extensive discussions and joint visits to many of the critical localities. The geology as here described does not necessarily coincide with that of the Anaconda staff. It is hoped that a definitive article on the geology of Britannia will be published by Anaconda geologists.

Geological Setting

The Britannia mine occurs in a pendant of mainly volcanic rocks intruded by several plutons (*see* Fig. 24 and Bostock, 1963). The stratified sequence (Gambier Group) is dominated by pyroclastic rocks of andesitic to dacitic character which are intercalated near the top and overlain by dark marine shales and siltstones. In a separate but lithologically similar pendant 6 miles south of Britannia, H. W. Tipper, of the Geological Survey of Canada, has recently collected Albian ammonites. Potassium-argon analysis on the Squamish Batholith that intrudes the Britannia pendant on the north gives an apparent age 92±4 million years (White, 1968). Formation of the ore deposits and intrusion of a dacite dyke swarm predate the

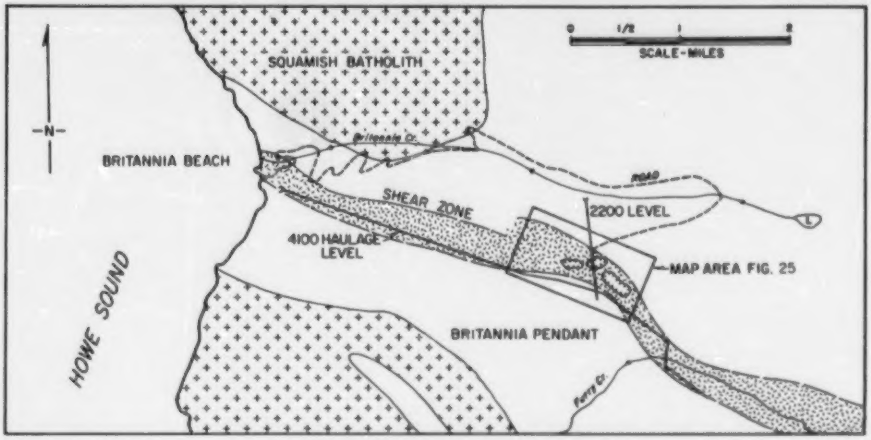


Figure 24. Britannia mine index map.

intrusion of this pluton. The volcanic pile north of the Britannia mine is tilted southward about 20 degrees as a monoclinal panel. This monocline is transected to the south by a northwesterly trending belt of intense deformation, one-quarter to one-half mile wide, that has been called the Britannia Shear Zone. The orebodies of the Britannia mine occur within this deformed belt.

Detailed Geology

The geology of the central portion of the shear zone is shown on Figure 25. Except for the Victoria and Empress, most of the orebodies that reach the surface do so within this area. Exposure and access are both relatively good. This area contains both margins of the shear zone and relatively good correlation can be made with rocks in both walls, although some problems of correlation exist with the sequence north of the map on the road to the area from Britannia Creek. On the basis of present work, stratigraphic thicknesses are approximate.

The intense development of schistosity of rocks within the shear zone makes correlation with those beyond difficult in the field. It is fundamental to the present interpretation that these correlations can be made. The key to the correlations is partly structural in that units can be traced around a plunging anticlinal nose within the shear zone, and partly stratigraphic in that a distinctive marker occurs in similar sequences in both walls and the anticlinal nose. The initial discussion of the stratigraphy assumes the correlations are valid and emphasis is placed on the character of the relatively undeformed rocks. The deformation and alteration are described subsequently.

Stratigraphy

There are two stratified sequences exposed in the map-area: a lower pyroclastic one and an upper shale-siltstone one which are cut by many large dykes. The older stratified sequence is composed of pyroclastic flow rocks of dacitic character called crystal-rich tuff breccia on Figure 25. These are light grey-green rocks normally lapilli grain size (2 to 20 millimetres) that are charged with chalky plagioclase crystals in matrix and clasts. They are compact rocks with a primary foliation but without bedding planes (*see* Plate XIIA). The foliation results from a high percentage of lenticular fragments, the most prominent of which are white or wispy black. These typical rocks grade rarely to somewhat coarser ones in which the

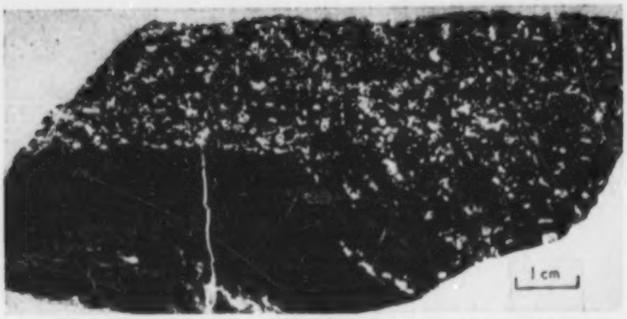


Plate XIA.—Britannia mine. Plagioclase crystal tuff truncating black argillite laminæ with minor plagioclase clasts. Marker beds from footwall northeast of Jane Basin.

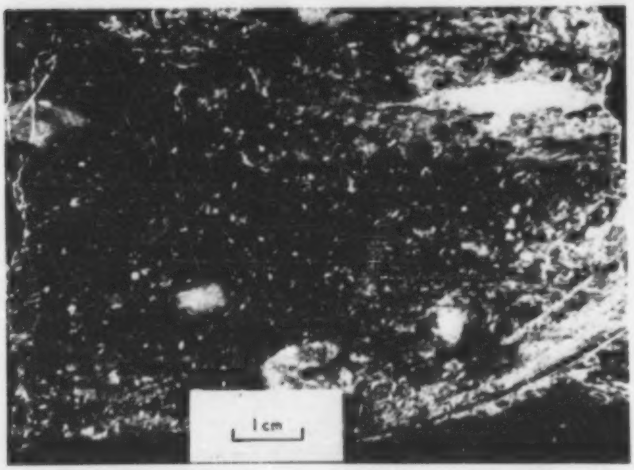


Plate XIB.—Britannia mine. Chlorite mottled schist with remnant plagioclase crystals in porphyritic clasts and in matrix and white crowded dacite porphyry clasts. From 4950 level near 040 orebody. Compare with Plates XIC, XIIB, and XIIC.

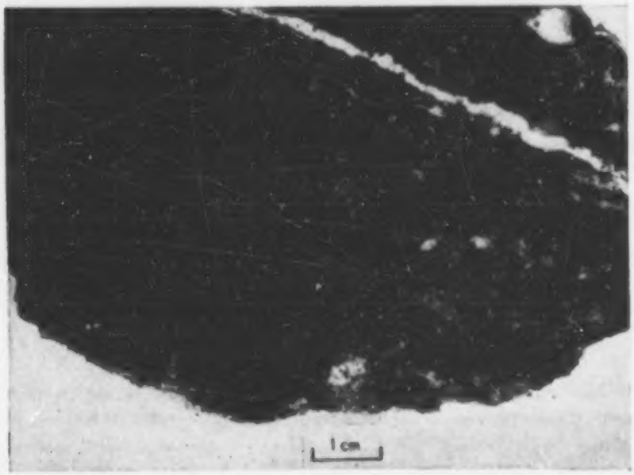


Plate XIC.—Britannia mine. Chlorite mottled schist with some white crowded dacite porphyry clasts but no recognizable plagioclase, Gordon Gallup pit.

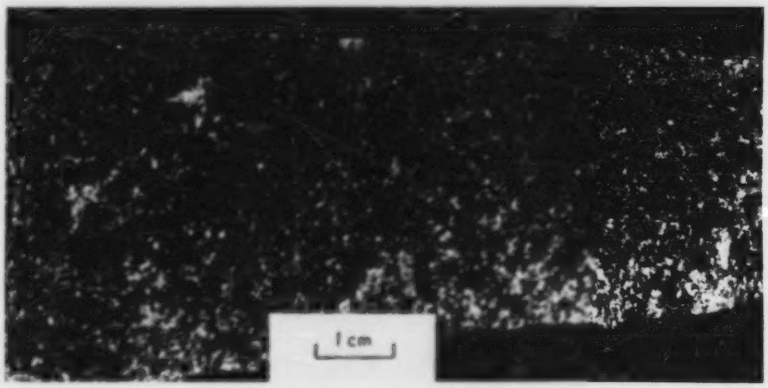


Plate XIIA.—Britannia mine. Undeformed crystal-lithic lapilli tuff from 500 feet south of hangingwall shear near Barbara pit.

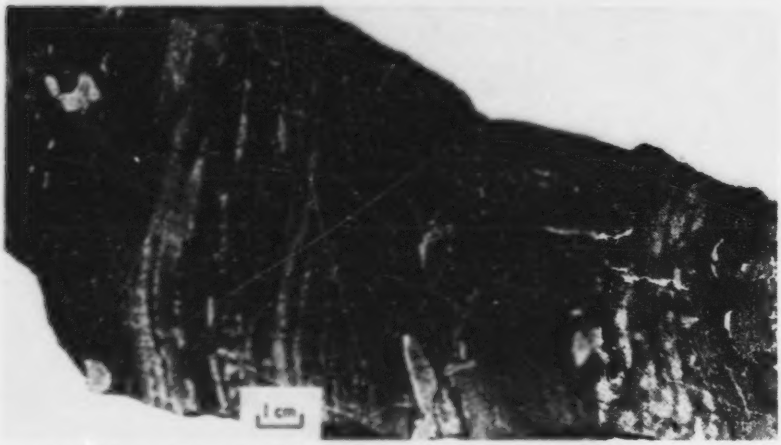


Plate XIIB.—Britannia mine. Altered green argillite with disseminated pyrite (white dots) and nodules of pyrite and quartz (light to dark grey). Lighter grey areas are bleached laminæ from near hangingwall and Fairview zinc orebody.

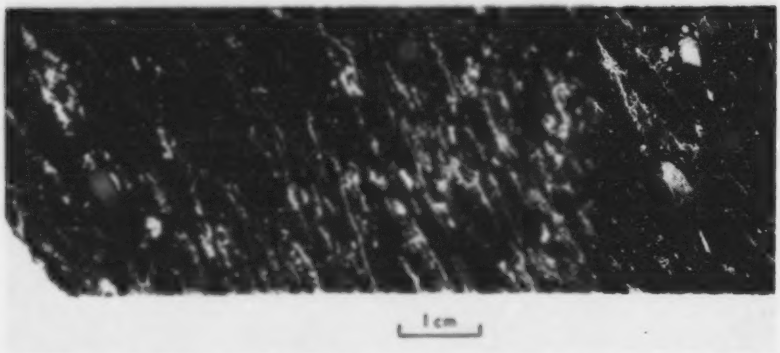
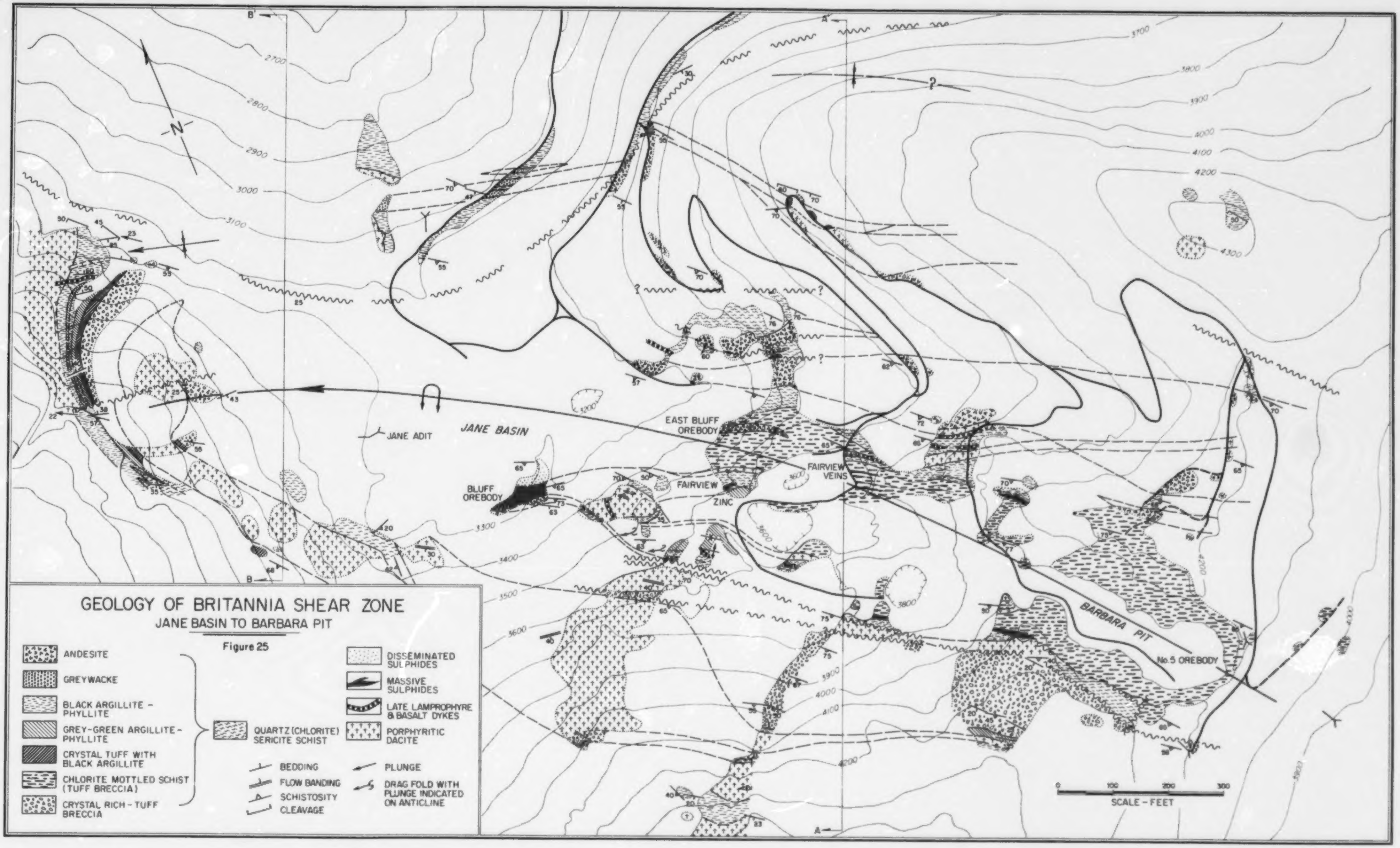


Plate XIIC.—Britannia mine. Highly deformed chlorite mottled schist now composed of chlorite and muscovite wisps, lenses of mosaic quartz, and clots of cubic pyrite. Drill core from near 040 orebody.



GEOLOGY OF BRITANNIA SHEAR ZONE

JANE BASIN TO BARBARA PIT

Figure 25

ANDESITE
GREYWACKE
BLACK ARGILLITE - PHYLLITE
GREY-GREEN ARGILLITE - PHYLLITE
CRYSTAL TUFF WITH BLACK ARGILLITE
CHLORITE MOTTLED SCHIST (TUFF BRECCIA)
CRYSTAL RICH - TUFF BRECCIA
QUARTZ (CHLORITE) SERICITE SCHIST
DISSEMINATED SULPHIDES
MASSIVE SULPHIDES
LATE LAMPROPHYRE & BASALT DYKES
PORPHYRITIC DACITE
BEDDING
FLOW BANDING
SCHISTOSITY
CLEAVAGE
PLUNGE
DRAG FOLD WITH PLUNGE INDICATED ON ANTICLINE
N
B'
B
A'
A
JANE ADIT
JANE BASIN
BLUFF OREBODY
EAST BLUFF OREBODY
FAIRVIEW
FAIRVIEW VEINS
ZINC
BARBARA PIT
No.5 OREBODY
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
4100
4200
4300
0
100
200
300
SCALE - FEET

primary foliation is not as prominent, or more commonly, to crystal-lithic tuffs with coarse sand-sized clasts. These invariably are well foliated and dominated in appearance by chalky plagioclase. They also commonly contain prominent dark wispy fragments and grade at the top of the pyroclastic sequence into distinctive beds which consist of intercalated black argillite and plagioclase crystal tuffs (*see* Plate XIA). These may be regularly interbedded, convoluted, or disaggregated by soft rock deformation. Within the pyroclastic sequence there may also be minor intercalations of black or green argillite or volcanic sandstone. Fragments of argillite also form a normal component of the pyroclastic flow rocks. The sequence of crystal tuff and successively overlying mixed crystal tuff and argillite, and well-bedded grey and green argillite, is considered the marker beds which outline the structure.

Overlying the marker beds is a sequence of black argillite and siltstone with minor intercalations of dark- to light-coloured greywacke and minor tuff. The black argillite and siltstone are relatively featureless, poorly bedded, but commonly cleaved. Intercalations of greywacke may show graded bedding, shale sharpstones, and minor slump structures.

The apparent local stratigraphic section is:

Top	Feet
Black argillite, siltstone, etc.	500±
Intercalated grey and green argillite	0–50
Mixed crystal tuff and black argillite	10–25
Plagioclase crystal tuff	25–50
Dacitic pyroclastic flows with minor argillitic interbeds	400+
Base	

Within the small area of Figure 25 there are obvious facies changes evident in regard to the marker and adjacent beds, with considerable variation in thickness as indicated in the table. It is unlikely that they would be useful very far beyond the map-area. Nevertheless, the transition from pyroclastic to sedimentary strata is invariably indicated by some part of the marker sequence within the map-area.

Intruding the stratified sequence are two major dyke sequences and a group of small late basic dykes. The early dyke intrusions are composed of dark grey-green andesites that commonly have a slightly mottled texture that reflects a fragmental nature. They may also contain abundant quartz and chlorite amygdules. The andesite bodies have complex field relationships. Some are intrusive thin lineal dykes whereas others form large wedge-shaped bodies of ambiguous relations. Even though formed of fragmental andesites, some seemingly are intrusive whereas others may be local pyroclastic flow domes. In the latter case they would have to occur as intercalations within the argillite sequence with such an initial distribution that they are now not present south of the anticlinal axis. They are clearly almost contemporaneous with the pyroclastic flow rocks and may be highly deformed and mineralized.

The second group are porphyritic dacites that are massive grey-green rocks with about 15 per cent plagioclase phenocrysts 1 to 2 millimetres long. Some have a flow foliation indicated by fluxion arrangement of phenocrysts and small inclusions, and uneven distribution of phenocrysts. Some are only microporphyritic but in general they have a characteristic appearance and texture. They are either not deformed or only slightly so on their margins. Their emplacement postdates major mineralization but they have a close spatial and structural relationship to orebodies. Both groups of major dykes are rare north of the shear zone.

Late dykes are common but volumetrically insignificant and include lamprophyre, basalt, and andesite. The lamprophyre is a dense brownish black rock with lenticular shiny black amygdules. The basalt is fine dense black rock and the andesite a dark-grey aphanitic rock.

On the map (Fig. 25) two other units are shown within the shear zone called chlorite mottled schist and quartz (chlorite) sericite schist. The former is believed to be the schistose equivalent of the dacitic crystal-rich tuff breccia as discussed later. The quartz (chlorite) sericite schist can be shown to have several origins. In general, it is produced by isochemical metamorphism of black argillite, but it is also formed, in part, by intense ductile shear of andesite or chlorite mottled schist. In particular, the westernmost outcrops of andesite were mapped in the field as quartz sericite schist but found on petrographic examination to be andesite. Also some of the bands within the chlorite mottled schist that appear to be quartz sericite schist are likewise probably highly deformed chlorite mottled schist. However, much of the schist appears to be altered black or grey-green argillite, especially that on the margin of the shear zone.

Petrography

Petrographic examination of the least deformed and altered representatives of the various rock types reveal the following:

1. Dacitic tuff breccias have the following range of compositions:

	Per Cent
Plagioclase crystals (oscillatory zoned An_{55-30})	10–30
Lathy equigranular plagioclase dacite and crowded dacite porphyry	2–10
Plagioclase phenocrysts in microcrystalline matrix	30–60
Chlorite fragments	10–20
Siltstone fragments	0– 5

The average size of fragments is estimated to be about 4 millimetres. As the average size decreases the percentage of plagioclase clasts increases somewhat, but even the finest crystal tuffs have as many lithic fragments as plagioclase clasts. The texture of the various volcanic fragments can be quite variable, but all are closely alike in total composition, and are probably dacites. The chlorite fragments are characteristic elements composed of pure, fairly coarse, aligned penninite chlorite, with or without plagioclase crystals. They normally have wispy shapes that are commonly moulded to adjacent stronger clasts. They may represent altered pumiceous fragments or possibly even more altered shale fragments.

The texture and composition of undeformed specimens are akin to that of submarine pyroclastic flow rocks (Fiske, 1963). The composition of the bulk of clasts is uniform, even though the texture varies. The plagioclase that occurs as clasts or as phenocrysts of lithic clasts is similarly zoned and of the same andesine to oligoclase composition. The foliated flow-moulded textures, together with wispy chlorite (pumice?) fragments indicate a probable pyroclastic flow origin just as the intercalation with marine shales also suggests marine origin.

The petrography of the crystal tuffs is similar to that of the tuff breccia but with finer average size and slightly higher concentrations of plagioclase clasts that in some cases show considerable abrasion. The petrography of the mixed tuff and argillites is identical to that of its component parts.

2. The black shales and siltstones are composed principally of a very fine clay and chlorite paste that commonly has an incipient preferred orientation. In this matrix a variable amount of angular feldspar silt clasts are embedded, together with opaque organic matter, ores, and leucoxene. Most of the shales have at least 5 per cent silt clasts and 5 to 10 per cent combined opaque matter. Greywackes

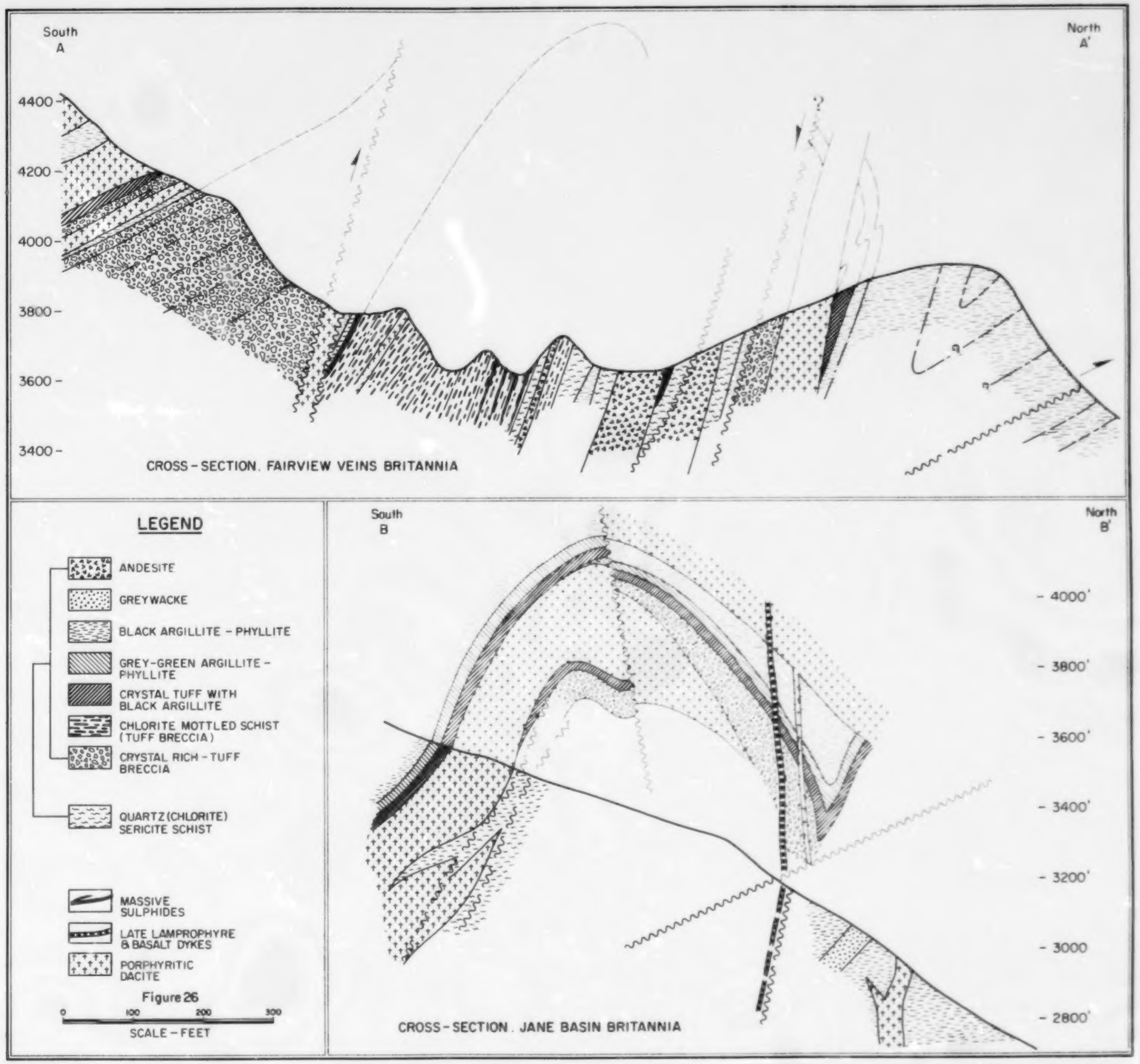

South
A
North
A'
4400
4200
4000
3800
3600
3400
?
CROSS-SECTION. FAIRVIEW VEINS BRITANNIA
LEGEND
ANDESITE
GREYWACKE
BLACK ARGILLITE - PHYLLITE
GREY-GREEN ARGILLITE - PHYLLITE
CRYSTAL TUFF WITH BLACK ARGILLITE
CHLORITE MOTTLED SCHIST (TUFF BRECCIA)
CRYSTAL RICH - TUFF BRECCIA
QUARTZ (CHLORITE) SERICITE SCHIST
MASSIVE SULPHIDES
LATE LAMPROPHYRE & BASALT DYKES
PORPHYRITIC DACITE
0
100
200
300
SCALE - FEET
South
B
North
B'
4000'
3800'
3600'
3400'
3200'
3000
2800'
CROSS-SECTION. JANE BASIN BRITANNIA

Figure 26

have a similar composition but are coarser with abraded plagioclase laths and angular to rounded quartz dominant in a minor pasty matrix.

3. The grey to greenish-grey argillites are similar to the shales with more plagioclase clasts and without significant organic matter. In addition, some spheroidal particles of unknown origin occur that are composed of quartz, carbonate, and a zeolite, and are about 0.3 millimetre in diameter.

4. All "andesite" specimens were found to be quite highly altered and deformed. They are composed of completely sericitized plagioclase phenocrysts and quartz chlorite amygdules in a finer-grained matrix of chlorite and sericite in which are recognizable small sericitized plagioclase laths and minor quartz, leucoxene, and pyrite. Most but not all specimens appear to have a fragmental texture. They are called andesites in contrast to the dacites because of the seemingly more mafic character.

5. Dacite porphyries are composed as follows:

	Range	Average
Phenocrysts		
Plagioclase (oscillatory zoned An_{48-44})	15–30	22.3
Augite	1–5	2.0
Matrix		
Plagioclase	55–65	60.7
Chlorite	2–15	9.0
Quartz	1–5	2.0
Ilmenite and leucoxene	3–4	3.7
		99.7

Somewhat rounded stubby phenocrysts of slightly zoned andesine, 1 to 3 millimetres long, with smaller augite phenocrysts occur in a trachytic to felted matrix dominated by small (0.1 ± millimetre) plagioclase laths but containing some quartz, ilmenite, or leucoxene, and a trace of potash feldspar.

6. Lamprophyre dykes have a composition as follows:

	Per Cent
Phenocrysts	
Plagioclase ($An_{54\pm}$)	2
Biotite	0.25
Matrix	
Plagioclase (An_{54-38})	40
Potash feldspar	38
Hypersthene	7
Chlorite-biotite	9
Opaques	2
Brown glass	1.75

Fresh, stubby, normally zoned plagioclase, with minor biotite phenocrysts, and lenses of altered brown glass occur in a trachytic matrix of slim plagioclase laths, hypersthene, and opaque minerals with interstitial potash feldspar.

Chemistry of Volcanic Rocks

The following table lists silicate analysis for least-altered specimens of porphyritic dacite, crystal-lithic tuff, chlorite mottled schist, and andesite. The major oxides have been recalculated to 100 per cent for more ready comparison, and

SO_3, P_2O_5, CO_2, and H_2O of the original analysis listed below. Comparison with Nockolds' tables (1954) indicates a good correlation between his average dacite and that of Britannia. In addition, the crystal-lithic tuff correlates well with his dacite, considering the possibilities for fractionation during pyroclastic eruption. Furthermore, the correlation of tuff and chlorite mottled schist is also good, with the destruction of the feldspars seemingly reflected in the chemistry (*see* later). The andesite is the least-altered specimen collected by the writer, but it is far from fresh. It is neither a typical andesite nor is it a basalt. For an andesite it is high in MgO and Na_2O and low in K_2O.

Chemical Analyses of Volcanic Rocks of Britannia Pendant

	1 Dacite 70AB5	2 Crystal Tuff 70AB36	3 Chlorite Mottled Schist 69AB8	4 Andesite 70AB25	5 Average Dacite	6 Average Andesite
SiO_2	62.10	69.27	66.56	51.59	63.58	54.20
TiO_2	1.00	0.64	0.62	1.56	0.64	1.31
Al_2O_3	16.88	16.42	15.44	20.43	16.67	17.17
Fe_2O_3	1.16	0.76	0.51	1.72	2.24	3.48
FeO	5.92	2.80	3.45	7.19	3.00	5.49
MnO	0.15	0.07	0.22	0.12	0.11	0.15
MgO	2.84	2.76	6.25	8.56	2.12	4.36
CaO	5.20	2.45	1.14	3.74	5.53	7.92
Na_2O	3.41	3.64	2.96	4.48	3.98	3.67
K_2O	1.28	1.08	2.63	0.62	1.40	1.11
P_2O_5	0.20	0.13	0.13	0.78	0.17	0.28
SO_3	0.12	0.01	0.19	2.41	0.56	0.86
H_2O-	0.02	0.03	0.04	0.05	—	—
H_2O+	4.64	3.96	1.68	5.84	—	—
CO_2	0.01	0.01	0.01	0.02	—	—

Analyses 1 to 4 by S. W. Metcalfe and R. S. Young, British Columbia Department of Mines and Petroleum Resources.

1—Dacite, from northwesternmost part of Figure 25.
2—Coarse crystal-lithic tuff, 400 feet south of Barbara pit.
3—Chlorite mottled schist, 4950 level east of 040 orebody.
4—Andesite, dyke in wall of Jane Basin, 200 feet north of Mammoth Bluff.
5—Average dacite, Nockolds, 1954, p. 1015.
6—Average andesite, Nockolds, 1954, p. 1019.
Analyses 1 to 4 with major oxides recalculated to 100 per cent.

Structure

The strata of the Britannia pendant north of the shear are tilted southward about 20 degrees in a gently warped monoclinal panel. This uniform dip is abruptly transformed at the Britannia Shear Zone where these rocks are highly deformed in a fault-bounded anticline and subsidiary syncline within the map-area (*see* Figs. 25 and 26). The anticlinal nose is quite clearly shown on the west slope of the Jane Basin where it plunges westward at 22 degrees. The marker beds of crystal tuff and argillite can be traced around the nose and on either limb beyond the marginal faults. The distorted and highly schistose core is filled principally with schistose fragmental andesite, sericite schist, and with chlorite mottled schist that is thought to be metamorphosed crystal-rich tuff breccia. Significant minor folds in green argillites, that appear equivalent to those of the marker bed sequence, show that the beds in the southern margin of the schist zone face south and that the anticlinal hinge lies to the north. In the core of the schist zone, bedding is rarely identified with certainty and the hinge zone cannot be located. The average dip of schistosity is somewhat steeper on the northern part of the schist zone so that it may there face northward. Certainly beyond the footwall fault the indications are that the marker beds are overturned and facing north. Beyond them the argillites should be folded in a syncline of which there is some evidence north of the plunging anticlinal nose.

The bounding faults do not appear to be continuous throughgoing faults but rather an *en echelon* sequence. This is suggested underground and can be inferred from the map (Fig. 25). The hangingwall fault(s) dip southward at about 70 degrees. Faults exposed near the footwall of the shear zone dip from 60 degrees to vertical.

An additional fault which is judged to be fairly important is exposed on the lowest hairpin turn. Here it strikes north 60 degrees west and dips 25 degrees southward. It is a small thrust that carries the overturned limb with marker beds and crystal tuff and tuff breccia over the argillite sequence with intercalated greywacke. Its continuity and its relation to the footwall fault are not known.

Both dyke sequences seem to be spatially related on the shear zone, being rare at a distance from it but very abundant within and adjacent to it. Intrusion of both pre-dates at least the latest movement. Because of their common fragmental nature, high vesicularity, and similarity to flow rocks in the pendant, the andesites appear to have been most likely intruded at shallow depth during the formation of the volcanic and sedimentary pile. The dacites are in general not schisted even in the core of the anticline, but the margins of the dyke in the hangingwall shear are highly cleaved in some localities. The large dacite wedges in the hangingwall show a flow structure coincident with bedding attitudes of the stratified rocks in some localities but highly contorted in others. Within the shear zone a common feature of the dacites is that they follow the schistosity as narrow dykes until a certain point where they blossom out into an enlarged crescentic body that commonly hoods over some orebodies. This is paradoxical, for the dacites must have been intruded late in the interrelated folding and faulting process.

Metamorphism and Alteration

Regional metamorphism in Britannia Pendant—All the rocks except the late basic dykes have been subjected to a low grade of regional dynamothermal metamorphism of greenschist facies. Changes due to this metamorphism include incipient (or minor) alteration of plagioclase to clinozoisite, mafic minerals to penninite or other chlorites, glass to very fine stilpnomelane, and minor prehnite in amygdules.

Dynamic metamorphism in Britannia Shear Zone—Dynamic metamorphism and hydrothermal alteration have had a more dramatic effect on the character and composition of the rocks than the regional metamorphism, particularly within the shear zone. All rocks within the shear zone have an intense second foliation. Progressive increase in the development of schistosity can be observed in the walls on approach to the shear zone, especially toward the hangingwall. In the latter case a parallel erasure of bedding in crystal-rich tuff breccias can be seen. In much of the shear zone bedding attitudes cannot be observed, but intercalations commonly indicate that bedding and schistosity are quite closely parallel. The rocks of the shear zone, except for the dacite porphyries and late dykes, are schists with a marked, flattened fabric with steeply west-raking lineation common. This is particularly noticeable in the chlorite mottled schist in which the chlorite mottles are commonly very thin lenses (for example, 15 by 8 by 1 millimetre), with the plunge of long dimension about 45 degrees and rake about 60 degrees in the vicinity of the East Bluff orebody.

Microscopically the development of schistosity is first evident as very fine new sericite that grows in the slight matrix of fragmental rocks. It wraps around fragments with an average orientation of that of the developing schistosity. More intense development arises with further growth of sericite, especially along "channels" between fragments accidentally oriented in the schistosity. Then new growth of sericite and chlorite in fragments occurs together with flattening of very fine-grained lithic fragments, moulding of weak fragments about strong clasts, and development of some schistose bands through fragments accidentally placed to connect earlier "channels." Increasing intensity involves boudinage and rotation of some strong clasts and further development of micas, particularly in a network of bands. Further increase involves not only coarse growth of micas and further flattening but also the breaking down of the feldspars. The latter is accomplished first by disruption of twin patterns, erasure of oscillatory zoning, and replacement by albite and quartz. This is followed by complete granulation, flattening, and replacement by mosaic quartz. The rocks immediately south of the hangingwall fault have reached the stage of incipient destruction of feldspar.

It is suggested by this study that the crystal-rich tuff breccia and crystal tuff are, in fact, the same stratigraphic unit as the chlorite mottled schist. This was suspected in the field, but the general lack of plagioclase phenocrysts and clasts in the latter made correlation uncertain (*see* Plates XIB and XIC).

The alterations evident microscopically of the titanium minerals is also interesting. Traces of ilmenite are found with leucoxene in a few of the freshest specimens of dacites outside the shear zone. All other rocks have leucoxene outside the shear zone, but within many have a mixture of very fine porphyroblastic sphene as well as leucoxene. One specimen of quartz sericite schist contained capillary rutile as well as sphene and leucoxene.

Hydrothermal alteration—Some of the effects of the dynamic metamorphism are difficult to separate from those of hydrothermal metamorphism, involving as they do growth of similar micas and replacement of feldspars by quartz. However, the intense hydrothermal alteration is much more local and appears to be imposed on rocks that already have attained the intense schistose-flattened fabric.

Surrounding the sulphide orebodies, the host rocks, commonly chlorite mottled schist or andesitic tuff, are affected by an outward grading alteration. Around and between the massive sulphide lenses remnant rocks are composed almost entirely of quartz, pyrite, and muscovite and minor chlorite. Not uncommonly, textures indicative of the original chlorite mottled schist, etc., are evident, but the chlorite mottles are partially or wholly replaced by muscovite. Elsewhere, particularly on the fringe areas, chlorite mottles are evident. These rocks are cut by pyrite or quartz pyrite veins of several generations. Outward from the suphide bodies the intensity of the silicification decreases gradationally and its mode changes from complete replacement to ramifying fine veinlets. In a parallel way pyrite also decreases, but muscovite-sericite, chlorite, and clinozoisite increase to proportions characteristic of the shear zone remote from sulphide bodies. Anhydrite, gypsum, and erratically distributed barite are found in discrete veins and disseminations in a zone roughly coincident with that of intense silicification.

Thermal metamorphism—The Squamish Batholith is exposed south of Britannia Creek on the road to the Jane Basin within a mile of Howe Sound (*see* Fig. 24). Here argillite and dacite continuous with those of the map-area are visibly thermally metamorphosed. Microscopic examination of the dacite shows the matrix has been recrystallized into a coarser polygonal mosaic of quartz and feldspar, and mafic minerals are replaced by fine felted brown biotite which also is incipiently developed in feldspar phenocrysts.

Sulphide mineralization—The sulphide orebodies of Britannia are highly heterogeneous mixtures of sulphides, remnant altered host rocks, and discrete veins. The parts that are predominantly sulphides have a characteristic braided appearance that results from the juxtaposition of lenticles of varying mineralogy separated by schistose mica bands and intersected by discrete quartz-sulphide and sulphide veins. Alternatively, the braided appearance results from original lenticular quartz-rich and mica-rich bands cut by a variable network of sulphide bands. Not uncommonly within orebodies, horses of less replaced rock exist in which the characteristic textures of the chlorite mottled schist or andesite can be recognized.

The main mineralogy of orebodies is simple and fairly constant. Pyrite is by far the most abundant mineral, with less chalcopyrite and sphalerite and minor erratically distributed galena, tennantite, or tetrahedrite. The main nonmetallic minerals include quartz and muscovite (chlorite), anhydrite, and siderite. The textures are highly variable and no particular study has been made of them. However, a common texture is one in which dense bands 1 to 4 inches wide of granular pyrite averaging about 0.5 millimetre in diameter, with scattered 2 to 3-millimetre grains, and very minor interstitial quartz and chalcopyrite, grade outward through cubic pyrite (0.5 millimetre) with significant interstitial quartz and chalcopyrite to wider quartzose bands with disseminated pyrite and clots of amœboid chalcopyrite. This may be cut by smaller bands almost discrete enough to be called veins, but without much continuity, that consist of sphalerite, lesser chalcopyrite, and quartz, with nests of galena and tennantite.

On the fringe of orebodies, rather similar pyrite veins exist that in their centre are practically devoid of quartz. The central zone of dense granular pyrite grades outward into the surrounding rock, with decreasing quantities of disseminated pyrite. These pyrite veins chiefly follow schistosity, but may bifurcate and transect schistosity at any angle for considerable distances.

Some of the grey-green argillites within the shear zone contain significant quantities of pyrite with traces of chalcopyrite. The appearance of these rocks is such that a syngenetic origin of the sulphides is possible (*see* Plate XIIB). Sulphide-rich layers are intercalated with the phyllitic argillites and may occur as laminæ or as nodules composed of almost solid pyrite with an incomplete zone of quartz near their outer rim. Some nodules resemble sharpstones, others resemble worm tubes. Planes of schistosity and fracture may also be coated with fine pyrite. The sulphide-rich beds are, as far as known, quite local in the vicinity of the top of the East Bluff and Fairview zinc orebodies. The latter is a sheet-like mass a few feet wide of concentrated pyrite, sphalerite, chalcopyrite, quartz, and barite that is parallel to metamorphic foliation. It contains few textures that offer evidence of its origin. The localized distribution as well as some of the features of the sulphide-rich beds are more likely indicative of replacement than syngenetic deposition, but the possibility of the latter is not eliminated.

The main massive orebodies, Bluff, East Bluff, No. 5, No. 8, and 040 or (No. 10), all show a marked zonal structure (*see* Figs. 27 and 28) in which they have one or more high-grade chalcopyrite cores enveloped successfully by a lower-grade zone and overlapping pyrite and siliceous zones. The plan of the 040 orebody on 4950 level shows this well, although it is less regular than some of the other orebodies. Zinc-rich ore tends to occur in the upper central parts of massive bodies and as almost separate sheet-like masses like the Fairview zinc vein. In section the main orebodies have a crude lens-like shape oriented within the schistosity and are commonly connected to a steeply plunging root which may or may not be of ore grade (*see* Fig. 27). The long dimension of the Bluff ore lenses plunges about 45 degrees to the west. The plunge increases in the western and eastern orebodies. It is of interest that, although the individual orebodies plunge steeper than the crest of the

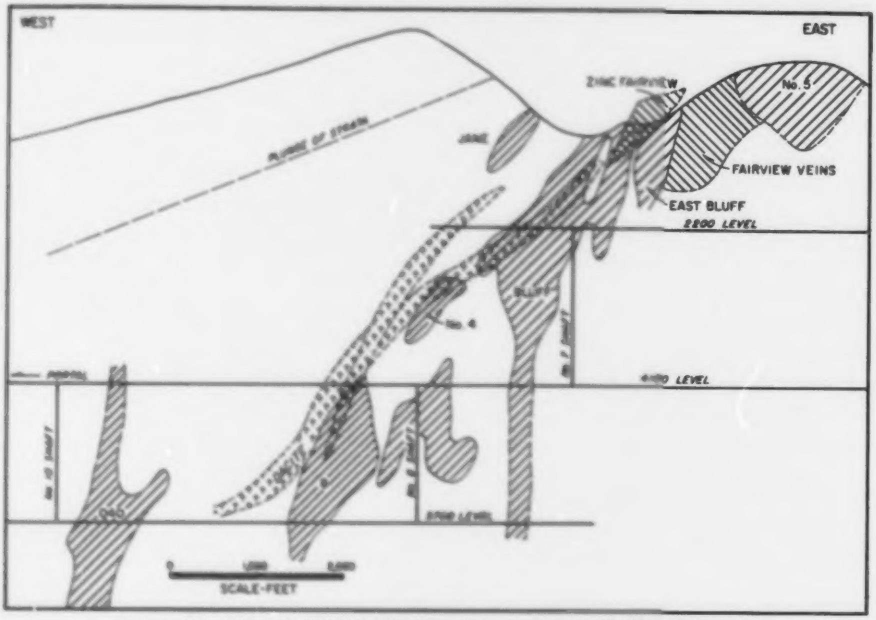

WEST
EAST
ZINC FAIRVIEW
No. 5
JANE
FAIRVIEW VEINS
EAST BLUFF
2200 LEVEL
BLUFF
No. 4
LEVEL
No. 10 SHAFT
040
0
SCALE-FEET

Figure 27. Projected longitudinal section, western orebodies, Britannia.

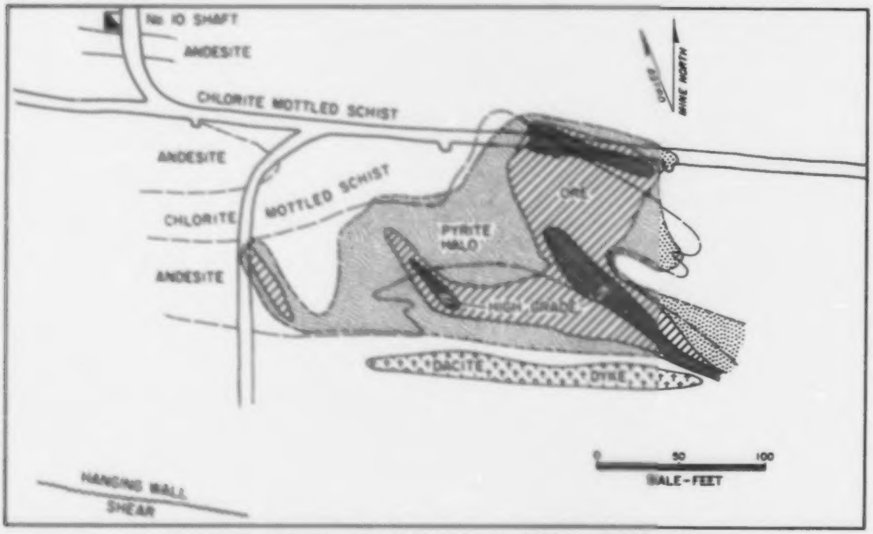

No. 10 SHAFT
ANDESITE
CHLORITE MOTTLED SCHIST
MINE NORTH
ANDESITE
CHLORITE MOTTLED SCHIST
ANDESITE
PYRITE HALO
ORE
HIGH GRADE
DACITE DYKE
0
50
100
SCALE-FEET
HANGING WALL SHEAR

Figure 28. Sketch of the 040 orebody, 4950 level, Britannia.

anticlinal srtucture, the over-all top of the ore zone plunges about the same as the latter and is crudely coincident with the base of the argillite sequence.

The other orebodies such as the Fairview, Empress, and Victoria are stringer lodes and veins composed of thin sheet-like masses of chalcopyrite and pyrite with some quartz that appear generally parallel to the schistosity but actually cut across schistosity in plan at a small angle. The tops of these orebodies are eroded so that one cannot guess whether they, too, might have had an upper limit at the argillites.

Environment of Ore Deposition

Much more study would be necessary to come to firm conclusions regarding the environment of ore deposition. Certain factors that are known are important, however, in any analysis of the environment. These include the following:

(1) The ore deposits are situated in a volcanic pile of intermediate composition, near the top of a pyroclastic accumulation that is overlain by a marine shale sequence.

(2) The near surface ore deposits are situated within a belt of ductile shear associated with a sharp anticlinal flexure to the south of a monoclinal panel.

(3) The ore deposits are situated in a concentration of an andesitic and dacitic dyke swarms and were formed between the period of intrusion of these two.

(4) Plutonic rocks thermally metamorphose the dacitic dykes that postdate ore deposition.

(5) The orebodies occur in several rock types and have a plunge much greater than the strata.

(6) The rocks in which the orebodies occur are a rapidly accumulated pyroclastic and sedimentary unit and a clastic dyke sequence.

(7) The orebodies are generally concentrically zoned and highly siliceous.

(8) With the possible exception for the sulphide-rich fine-grained phyllites over the Fairview zinc orebody, the gross and detailed textures of the massive sulphide orebodies are indicative of replacement after the development of schistosity.

From these observations one may conclude that the orebodies are chiefly replacement deposits formed in a volcanic site and that the sharp flexure, dyke swarms, and ore deposits are all probably genetically related. The deposit has great similarity to the Keiko ore of Japanese Kuroko deposits. A source of the sulphides might be a series of solfataras localized by the developing flexure and related to the intrusion of the dyke swarms.

WORK DONE:

During 1970, development work in the Britannia mine consisted of 13,179 feet of drifting and crosscutting, 3,322 feet of raising, 24,854 feet of diamond drilling, and 734 feet of shaft sinking.

Load-haul-dump diesel trackless haulage equipment was introduced for most short-haul development, stope preparation, and production work. Mining was completed in the No. 4 shaft section and the hoisting equipment was removed from the shaft in August.

The first stage of the No. 10 shaft sinking was completed to a point 113 feet below the 5700 level, making the total length of the shaft 1,914 feet from the back of the sheave wheel to the sump. A 1,000-horsepower, four-rope, semi-automatic Koepe hoist with two 7-ton 140-cubic-foot Sala ore skips was installed in the No. 10 shaft. A separate double-deck service cage capable of carrying 40 men was installed in the third compartment. The No. 10 mine was put into production during October. The underground crushing plant, conveyors, and measuring pockets on 5700 level of the No. 10 shaft were put into operation at the end of November.

A 150-horsepower ventilation fan was installed on 4100 level. Two 500-kva. utilized substations were installed at No. 10 shaft on 2500 and 5700 levels. A jaw crusher driven by a 200-horsepower motor was installed at the bottom of No. 10

shaft. Twenty-five hundred feet of three-conductor No. 1 A.W.G., 7,000-volt power cable was installed from the 4100 load centre to the 5700 level at No. 10 shaft.

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NEW WESTMINSTER MINING DIVISION

PITT RIVER

DD (MARGARET) (No. 3, Fig. F)

LOCATION: Lat. 49°36.5′ Long. 122°44′ (92G/10E)
On Boise Creek, 4 miles west of Pitt River at 1,650 feet elevation.

CLAIMS: DD 1 to 20.

ACCESS: From Highway 7 by ferry up the Pitt River to the north end of Pitt Lake, thence by logging-road and trail.

OWNER: B & T MINES LTD., 3567 West 27th Avenue, Vancouver 8.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur in veins and as disseminations in altered and granitized sediments(?) and volcanics.

WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 200 feet and geochemical soil survey, 316 samples covering DD 1 to 4, 7 to 10, 13, 14, 17, and 18 claims.

REFERENCES: *B.C. Dept. of Mines,* Bull. 9, pp. 58–61; *Minister of Mines, B.C.,* Ann. Rept., 1967, pp. 67, 68; Assessment Reports 1100, 2794.

STAVE LAKE

KF (No. 4, Fig. F)

LOCATION: Lat. 49°35′ Long. 122°05′ (92G/9E)
At approximately 5,600 feet elevation, 11 miles northeast of the north end of Stave Lake.

CLAIMS: KF 1 to 84.

ACCESS: By air.

OWNER: CANEX AERIAL EXPLORATION LTD., 800, 1030 West Georgia Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Fracture-controlled chalcopyrite and molybdenite mineralization in Coast Range quartz diorite.

WORK DONE: Claims mapped in part; topography mapped; surface geological mapping, 1 inch equals 200 feet on KF 1 to 8, 11, 13, 15; trenching, 50 feet on KF 3; surface diamond drilling, seven holes totalling 3,652 feet on KF 1 to 4.

ALOUETTE LAKE

P, JA (No. 5, Fig. F)

LOCATION: Lat. 49°16.2′ Long. 122°29′ (92G/8W)
One mile south of the south end of Alouette Lake, at approximately 1,500 feet elevation.

CLAIMS: P 1 to 8, JA 1 to 8.

ACCESS: By secondary road, 8 miles northeast from Haney.

OPERATOR: JAVELIN MINES LTD., 714 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Chalcopyrite, pyrite, and pyrrhotite occur in a basic phase of Coast Range quartz diorite.

WORK DONE: Geological mapping, 9 line-miles of soil geochemical sampling, and 6 line-miles of magnetometer surveying.

REFERENCE: Assessment Report 2601.

HARRISON LAKE

LUV, STONEY, DS (No. 37, Fig. H)

LOCATION: Lat. 49°20.5–23.6′ Long. 121°50.7–54.4′ (92H/5W)
At approximately 1,000 feet elevation, west of Harrison Lake, around Weaver Lake and north to Brett Creek, 5 to 8 miles northwest of Harrison Hot Springs.

CLAIMS: LUV, STONEY, DS, LM, 104 in all.

ACCESS: By gravel road from Harrison Mills, 8 miles.

OPERATOR: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

METALS: Copper, zinc.

DESCRIPTION: Chalcopyrite and sphalerite occur in association with fractures in andesitic flows and agglomerates.

WORK DONE: Geological mapping, 1 inch equals 500 feet; geochemical survey, 120 stream sediment samples and 65 soil samples.

REX (No. 29, Fig. H)

LOCATION: Lat. 49°15.6′ Long. 121°50.8′ (92H/5W)
At approximately 250 feet elevation on the southwest side of Mount Agassiz, 4 miles west of Agassiz.

CLAIMS: REX 3, 4; JAY 1, 2; MIDNIGHT 1 to 4.

ACCESS: By road from Highway 7, 1 mile.

OWNER: HUNER MINES LIMITED, 20624—113th Avenue, Hammond.

METALS: Copper, silver.

WORK DONE: Trenching, 95 feet on Midnight 1, 2, and 4; stripping, area 50 by 200 feet on Midnight 1 and 2.

NI, AL, OX (No. 55, Fig. H)

LOCATION: Lat. 49°27.4–34.8′ Long. 121°28.5–46.2′ (92H/5E, 5W, 12E, 12W)
Large area centred around The Old Settler mountain, 16 miles northeast of Harrison Hot Springs.

CLAIMS: NI, AL, OX.

ACCESS: Partly by logging-road.

OWNER: GIANT EXPLORATIONS LIMITED, 1131 Melville Street, Vancouver 5.

METALS: Nickel, copper.

DESCRIPTION: Basic and ultrabasic intrusives in sedimentary and volcanic rocks.

WORK DONE: Stream sediment and soil sample geochemical survey, airborne magnetometer survey.

REFERENCES: Assessment Reports 2469, 2583, 2801.

HOPE

PRIDE OF EMORY MINE (No. 140, Fig. H)

By J. W. Robinson

LOCATION: Lat. 49°28.3′ Long. 121°29.9′ (92H/6W)
At the head of Stulkawhits (Texas) Creek, which flows eastward into the Fraser River, 8 miles north of Hope.

ACCESS: By a gravel road about 5 miles long which leads from the Trans-Canada Highway, 8 miles north of Hope, to the mine plant at the 2600 level.

OWNER: GIANT MASCOT MINES LIMITED, 1131 Melville Street, Vancouver 5.

METALS: Nickel, copper (*see* Table 1 for production).

WORK DONE:

During 1970, development work in the Pride of Emory mine consisted of 3,855 feet of drifting and crosscutting, 3,077 feet of raising, and 65,039 feet of diamond drilling.

On 2600 level (the lowest level and main haulage), an alternative adit was started about 300 feet from the 2600 portal to provide an alternate ventilation airway, access to a waste dump, and exploration of the Portal ore zone. On 2950 level, development work was done on the 4400, 4600, 1600, and 1400 orebodies. The 110 ore pass raise was completed to the 3250 level and a manway raise was driven from 2950 to 3250 level in the area just outside the 4600 orebody. A 13 by 13-foot trackless haulage heading was driven on the 3050 level northward into the previously undeveloped northeast ultrabasic zone. The 1700, 1800, 2200, and Climax ore zones were intersected. A 915 LHD unit is used to remove the broken rock from the heading. On 3550 level a crosscut was driven to the 4300-4600 ore area and a raise was driven to the 3800 elevation to explore and develop these ore zones. Two Boyles BBS17A electric diamond drills are in continuous use underground, drilling 1,200 to 1,500-foot exploratory holes. Timbering of the shaft and installation of shaft guides to accommodate a new skip with a planer tooth safety device mounted on the crosshead is about 40 per cent complete.

On August 2, 1970, a fire which started while repairs were being made to a chute above the cone crusher destroyed the mill, assay office, warehouse, dry, machine-shop, compressor house, all surface electrical installations except the main transformer station, and mine offices. Only an old unused shop building, the cookhouse, bunkhouse, and several small trailers remained. Immediately following the fire, the decision was made to rebuild. At year end, a two-story office and warehouse, the mine dry, the compressor house, the crusher plant and conveyor house, the concentrate building, and the filter building had been erected. The 12-kv. powerline has been rebuilt to British Columbia Hydro and Power Authority standards and new 4/0 A.C.S.R. conductors have been strung. A new 150-kva. 12,000–480-volt transformer station was built to supply power to the 3050 level. Work is continuing and operations are expected to resume in early 1971.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 196.

BEA, GIANT, SWEDE (No. 54, Fig. H)

LOCATION: Lat. 49°25–29′ Long. 121°26–32′ (92H/5E, 6W)
Two to 6 miles north of Hope.

CLAIMS: BEA, GIANT, SWEDE, MARY G, PUFF, PAT, and others totalling 131 full claims and fractions.

ACCESS: Road from Highway 1.

OWNER: KELSO EXPLORATIONS LTD., 470 Granville Street, Vancouver 2.

METALS: Nickel, copper.

DESCRIPTION: Copper and nickel sulphide disseminated in basic and ultrabasic rocks.

WORK DONE: Surface workings surveyed; geological survey of Swede, Bea, Mill, Giant, and Pat claims; self-potential, electromagnetic, and ground magnetometer surveys of Swede claims; soil sample geochemical survey of Bea, Mill, Swede, Giant, and Pat Claims; 26,540 feet of trenching on Swede, Bea, Mill, and Giant claims; three holes totalling 1,119 feet diamond drilled on Swede 9 and 42 claims; and one-half mile of road built on Swede 49 claim.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 197; Assessment Reports 2505, 2612, 2660, 2743, 2744, 2745.

CLOVER LEAF (No. 27, Fig. H)

LOCATION: Lat. 49°21.5′ Long. 121°37′ (92H/5E)
At approximately 900 feet elevation, on Ruby Creek, about 1 mile from mouth, 8 miles west of Hope.

CLAIMS: CLOVER LEAF 1 to 4, BEN 1 to 35.

ACCESS: By road from Ruby Creek, one-half mile.

OWNERS: W. E. HARVEY and JACK WHITE, 3450 West 35th Avenue, Vancouver 16.

METALS: Gold, silver, nickel, copper.

DESCRIPTION: Sulphide mineralization in talc in shear zone in serpentine.

WORK DONE: Surface diamond drilling, three holes totalling 60 feet on Clover Leaf 1 claim.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 198; Assessment Report 2666.

DIANE (No. 17, Fig. H)

LOCATION: Lat. 49°18.7′ Long. 121°37′ (92H/5E)
At 500 to 750 feet elevation, on the east side of Wahleach Creek, three-quarters of a mile south of the Fraser River.

CLAIMS: DIANE 1 to 6.

ACCESS: By Jones Lake road from Laidlaw, 2 miles.

OWNER: ALMAZA MINING CO. LTD., 3797 Kingsway, Burnaby 1.

METALS: Gold, silver, cobalt.

WORK DONE: Fifty feet of underground work on the Diane 1 claim.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 198.

CAM, PO, PO EXT (No. 28, Fig. H)

LOCATION: Lat. 49°20′ Long. 121°30′ (92H/6W)
At 700 to 1,500 feet elevation, between Eureka and Wardel Creeks, 3½ miles southwest of Hope.

CLAIMS: CAM 1 to 5, PO 1 to 8, PO EXT, CAM EXT 1 to 3, RAM, ROOTSIE.

ACCESS: By tractor road from Silver Creek road, 4,000 feet.

OWNER: CAMROCK MINES LTD., Box 594, Hope.

METALS: Gold, silver, copper.

DESCRIPTION: Fissure veins in granodiorite.

WORK DONE: Compass survey of surface and underground workings; 80 feet of trenching and 150 feet of stripping on Po Ext.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 65 (*see* Cam, Cam Ext, Ram).

EUREKA, VICTORIA (No. 30, Fig. H)

LOCATION: Lat. 49°18.5′ Long. 121°27.5′ (92H/6W)
At approximately 5,700 feet elevation on north side of Silver Peak, 5½ miles south of Hope.

CLAIMS: VICTORIA (Lot 23), EUREKA (Lot 24), SCHOOLEY-DUNBAR (Lot 25), JOE 1 to 20, ABLE 1 to 3, 5, 7.

ACCESS: By road from the Trans-Canada Highway, 10 miles.

OWNER: HOLY CROSS MOUNTAIN MINES LTD., 705, 850 West Hastings Street, Vancouver 1.

METAL: Silver.

WORK DONE: Claims and workings surveyed.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1963, p. 90; 1924, p. 138; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 199; *Geol. Surv., Canada*, Mem. 139, p. 152.

CHILLIWACK LAKE

GL, ID, TA (No. 91, Fig. H)

LOCATION: Lat. 49°08′ Long. 121°27′ (92H/3W)
Between 3,200 and 4,100 feet elevation, at Greendrop Lake, 3½ miles north of Chilliwack Lake.

CLAIMS: GL 1 to 28; ID 1, 3, 5, 7, 8; TA 1 to 6.

ACCESS: By helicopter or foot trail from the north end of Chilliwack Lake, 4 miles.

OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METALS: Molybdenum, copper.

DESCRIPTION: Fractured and altered quartz monzonite with quartz veins containing pyrite, magnetite, chalcopyrite, and molybdenite; pyrite most abundant sulphide; some intense kaolinization.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on ID 5 and 7, TA 1 to 3 and 5, GL 15, 17, and 24; induced polarization survey, 4.9 line-miles and geochemical soil survey, 161 samples on GL 17 and 24, ID 3, 5, 7, and 8, and TA 1 to 6; trenching, 24 pits totalling 2,367 cubic feet on TA 2 and 3, ID 5, and GL 15 and 17; surface diamond drilling, one hole totalling 661 feet on TA 3.

SKAGIT RIVER

AM (No. 139, Fig. H)

By J. W. Robinson

LOCATION: Lat. 49°09.8′ Long. 121°01.3′ (92H/3E)
Near the western boundary of Manning Park.

CLAIMS: Approximately 170 full size and fractional claims.

ACCESS: Via the Hope–Princeton highway from Hope a distance of 31 miles, thence 3 miles south by mine road.

OWNER: GIANT MASCOT MINES LIMITED, Canam Division, 1131 Melville Street, Vancouver 5 (formerly owned by Canam Copper Company Ltd.).

METALS: Copper, silver, molybdenum (no production in 1970).

WORK DONE: In 1970 work began on March 15 and continued until November 15, with an average crew of 18 men, including supervisors. The No. 10 level was opened up where it had caved at the main fault to provide an opening for adequate ventilation. The material which had caved on No. 15 level was removed. Approximately 200 sets of timber were placed to support the adit. Most of this timber was installed in the vicinity of the main fault zone. Seven hundred and fifty-one feet of crosscutting and drifting, 24 feet of raising, and 207 feet of diamond drilling were done for the purpose of sampling and assessing the southeast zone on the No. 15 level.

REFERENCES: Kent, Paul, 1964, *Econ. Geol.*, Vol. 59, pp. 1551–1563; *Minister of Mines, B.C.*, Ann. Repts., 1965, pp. 206–212; 1968, p. 78; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 199, 200.

COQUIHALLA LAKE

TEKA (No. 92, Fig. H)

LOCATION: Lat. 49°38–39.8′ Long. 120°58.2′ to 121°00′ (92H/10W)
On the west slope of Henning Mountain, adjacent to Coquihalla Lake to the northeast.

CLAIMS: TEKA 1 to 48.

ACCESS: By road from Merritt, 30 to 40 miles.

OWNER: VANCO EXPLORATIONS LIMITED, 900, 1111 West Hastings Street, Vancouver 1.

METAL: Copper.

WORK DONE: Geochemical soil survey, 300 samples covering Teka 1 to 48.

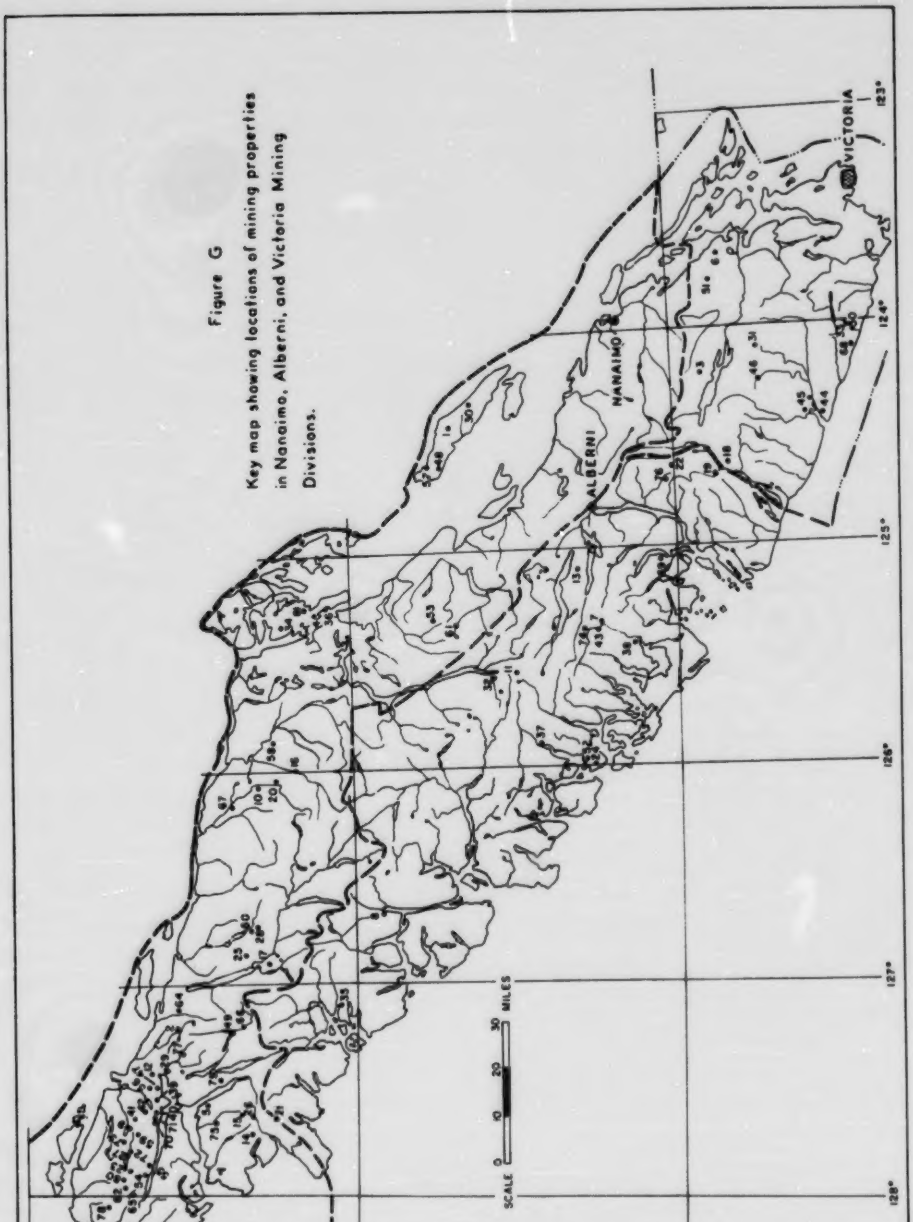

ALBERNI
NANAIMO
VICTORIA
SCALE
0
10
20
30
MILES
123°
124°
125°
126°
127°
128°
49°
50°
51°

Figure G

Key map showing locations of mining properties in Nanaimo, Alberni, and Victoria Mining Divisions.

KEY TO PROPERTIES ON INDEX MAP, FIGURE G

1 VERN, page 283.
2 KEOGH, page 270.
3 ANNE, page 290.
4 COPPER HILL, COLLEEN, page 280.
5 YREKA, page 272.
6 SIRIUS, page 292.
7 VENT, page 288.
8 GEO, page 284.
9 ADD, MOR, WOB, page 264.
10 BOYES, page 278.
11 CREAM, BEAR, page 286.
12 EXPO, CAR, TAR, page 269.
13 HM, page 288.
14 JARR, page 271.
15 OFF, page 272.
16 WR, page 279.
17 DIA, page 274.
18 MJ, MCC, JW, page 290.
19 NAT, NIT, LX, page 289.
20 CAM, DOC, page 279.
21 LOIS, page 283.
22 ANDY, PAK, page 289.
23 HEP, EXPO, page 262.
24 CATFACE, page 287.
25 KINMAN, page 273.
26 TENT, page 271.
27 HPH, NORMAN, page 263.
28 BON, page 274.
29 HAR, EXPO, page 270.
30 TEX, BOB, page 283.
31 ALPHA, BETA, HILLCREST, page 291.
32 PRICE, page 285.
LYNX MINE, page 284.
PARAMOUNT (MYRA FALLS MINE), page 285.
33 JAN, page 293.
34 COPPER ROAD, LUCKY JIM, page 280.
35 MARK, LAURA LEE, page 284.
36 TANNER, page 281.
37 BIG BOY, page 286.
38 NDB, WCR, page 288.
39 BID, BON, page 266.
40 MAR, page 266.
41 M, EM, TREC, page 264.
42 CALEDONIA, BLUEBELL, CASCADE, page 265.
43 OK, page 287.
44 LELLA, page 292.
45 SUE, JIM, CATY, VAL, page 292.
46 NAN, page 291.
47 ISLAND COPPER, page 267.
48 TEXADA MINE, page 282.
49 OLD SPORT MINE, page 273.
50 SUNLOCH and GABBRO, page 292.
51 LENORA, TYEE, RICHARD III, page 291.
52 PW, RW, JB, page 286.
53 MT. WASHINGTON COPPER, page 281.
54 H, page 259.
55 KW, page 259.
56 LITTLE JOE, page 266.
57 MARBLE BAY, LITTLE BILLY, page 282.
58 ELLEN, LEM, DOT, page 279.
59 A, B, X, page 263.
60 BOB (BONANZA MINE), page 274.
61 BRENT, JOHN, CATHY, page 282.
62 RED DOG, page 259.
63 CS, CID, RAN, page 258.
64 NOR, page 271.
65 HOL, page 259.
66 RAINY, BLUE OX, COSTA, page 273.
67 CV, PLUS, page 278.
68 MEAD (formerly REN), page 293.
69 GE, page 289.
70 EB, page 265.
71 WIZ, page 265.
72 SILVA, page 263.
73 HAW, WIT, CIA, page 263.
74 TES, page 287.
75 KIM, FeCu, CuFe, page 272.
76 WWW, JAN, page 289.
77 PENNY, page 270.
78 H, A, page 258.
79 SEL, SHIRLEY, KAREN, page 272.
80 MO, MOM, BUD, TI, page 262.
81 CONTACT, COPPER VALLEY, page 281.

NANAIMO MINING DIVISION

RUPERT INLET-CAPE SCOTT MAP-AREA

By K. E. Northcote

The following is a progress report on the geology of the Rupert Inlet-Cape Scott area and is based on the results of geological mapping done during the 1968 to 1970 field seasons. The mapped area covers about 400 square miles. Regional mapping, scale 1 inch to 1 mile, has virtually been completed and detailed mapping, scale 1 inch to 400 feet, was done on the Red Dog and Island Copper properties. Preliminary maps of the Rupert Inlet-Cape Scott map-area and the Red Dog and Island Copper properties are included in this report.

Contemporaneously with this project, J. E. Muller, of the Geological Survey of Canada, was carrying out regional mapping for different purposes, scale 1 inch to 4 miles, of a much larger area of northern Vancouver Island. There was full co-operation and communication in the field and during preparation of preliminary maps. Some potassium/argon determinations have been completed for this project by W. H. White and his staff at the geochronological laboratory at the University of British Columbia. Further geochronological studies of intrusive and volcanic rocks and mineral deposits of northern Vancouver Island are contemplated.

Exploration activity stimulated by the Island Copper copper-molybdenum discovery on the north shore of Rupert Inlet resulted in more than 4,000 claims being staked in the map-area by the end of 1968. Claims were staked in order to assure acquisition of ground prior to conducting exploration. Exploratory work performed in the map-area showed a decline in 1970 as compared to the two preceding years.

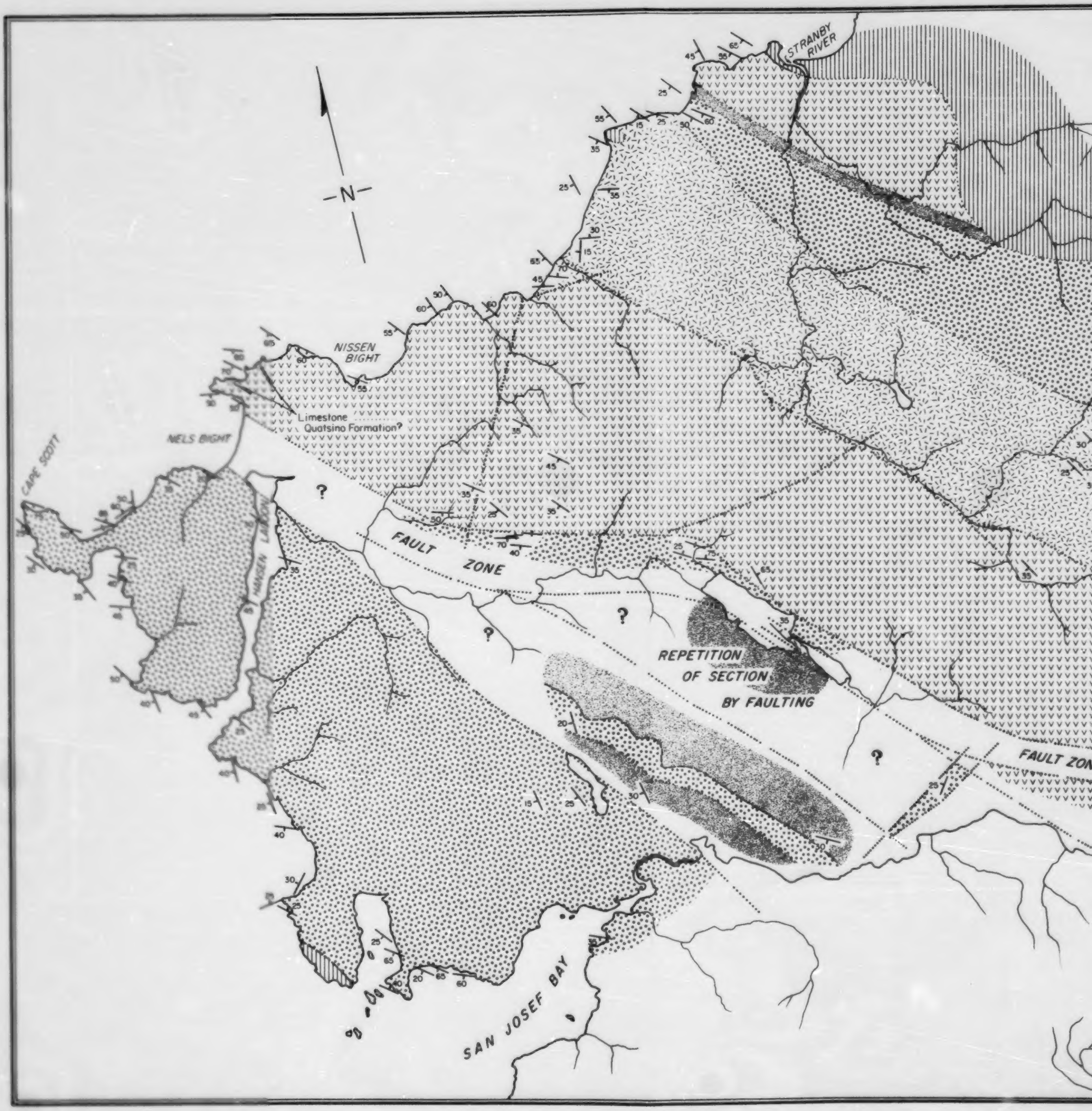
REGIONAL GEOLOGY

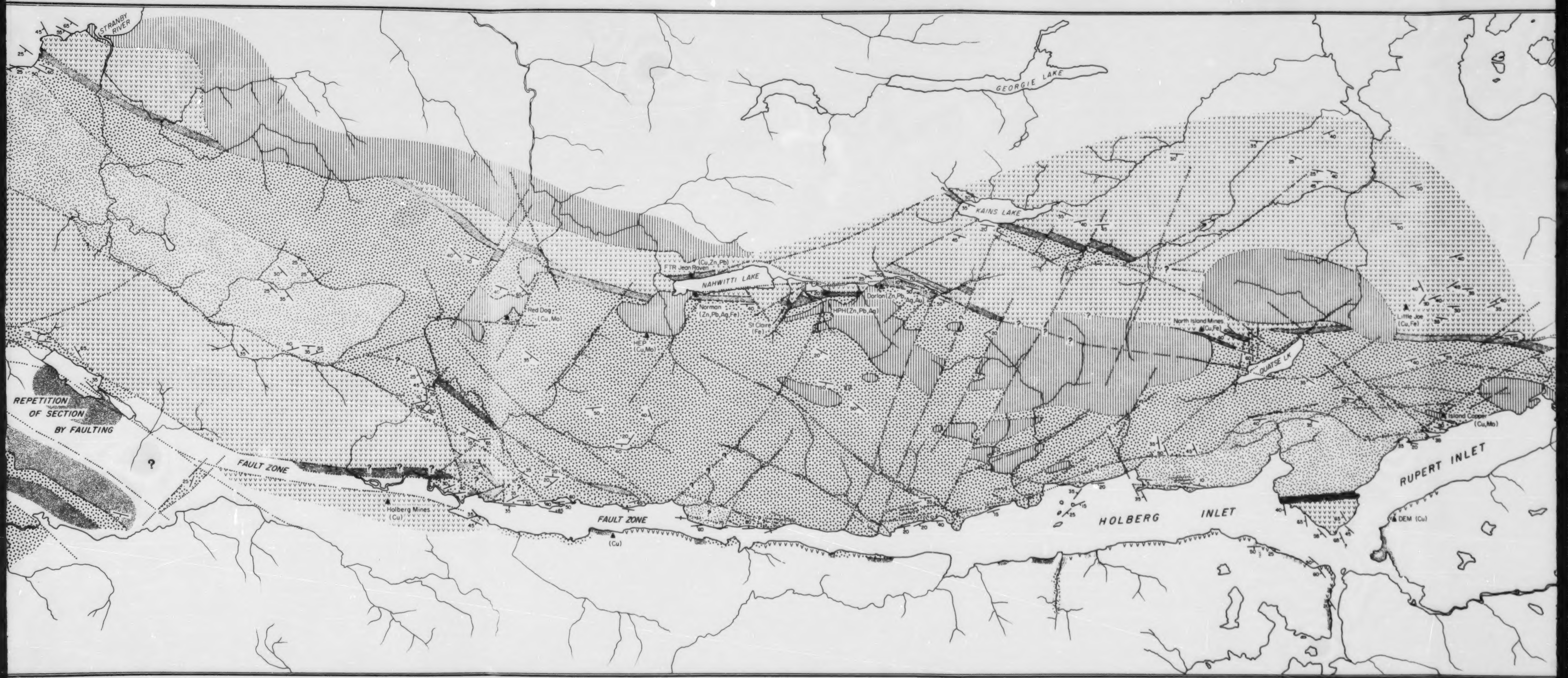
The area of most intense mineral exploration activity follows a belt of intrusive stocks, of apparent mid-Jurassic age, which extend from the east end of Rupert Inlet northwesterly to the mouth of the Stranby River. These stocks suggest that a shallow batholith may underlie the map-area. The line of intrusives is roughly coincident with the regional trend of the upper part of the Karmutsen Formation, the Quatsino Formation, and the sedimentary and lower pyroclastic part of the Bonanza Subgroup. All of these volcanic and sedimentary rock units form part of the Vancouver Group and are unconformably overlain by Lower Cretaceous sedimentary rocks. Regional block faulting results in local repetition or loss of parts of the stratigraphic column.

Karmutsen Formation

Rocks of the upper part of the Karmutsen Formation, of Triassic age, are characteristically medium to dark green-grey, interbedded massive porphyritic and amygdaloidal flows. Tuff is interbedded with flows and some pillow breccia and poorly developed pillows occur. Refractive indices of fused beads of rock from the flows indicate a basaltic composition. Amygdules are filled by quartz, epidote, chlorite, and less commonly by calcite, pumpellyite, and zeolites. A pervasive very low grade of metamorphism is indicated by the presence of chlorite, epidote, and less conspicuously by zeolites, calcite, and sericite. Epidote characteristically stands in relief as nodules on medium brown "sandy textured" weathered surfaces. Dykes of dioritic to gabbroic composition are common throughout the map-area and may represent feeders for flows higher in the section.

One, two, or more thin limestone beds (25 to 50 feet thick) occur near the top of the Karmutsen Formation. Their occurrence within the section appears to be


N
STRANBY RIVER
NISSEN BIGHT
NELS BIGHT
CAPE SCOTT
HANSEN LAGOON
Limestone
Quatsino Formation?
FAULT ZONE
?
REPETITION OF SECTION BY FAULTING
FAULT ZON
SAN JOSEF BAY


STRANBY RIVER
GEORGIE LAKE
KAINS LAKE
NAHWITTI LAKE
FTR Jean Raven (Cu,Zn,Pb)
Norman (Zn,Pb,Ag,Fe)
St Claire (Fe)
HPH (Zn,Pb,Ag)
Dorlon (Zn,Pb,Ag,Au)
Red Dog (Cu,Mo)
HEP (Cu,Mo)
North Island Mines (Cu,Fe)
Little Joe (Cu,Fe)
QUATSE LK
Island Copper (Cu,Mo)
REPETITION OF SECTION BY FAULTING
FAULT ZONE
Holberg Mines (Cu)
FAULT ZONE
(Cu)
HOLBERG INLET
RUPERT INLET
DEM (Cu)
?

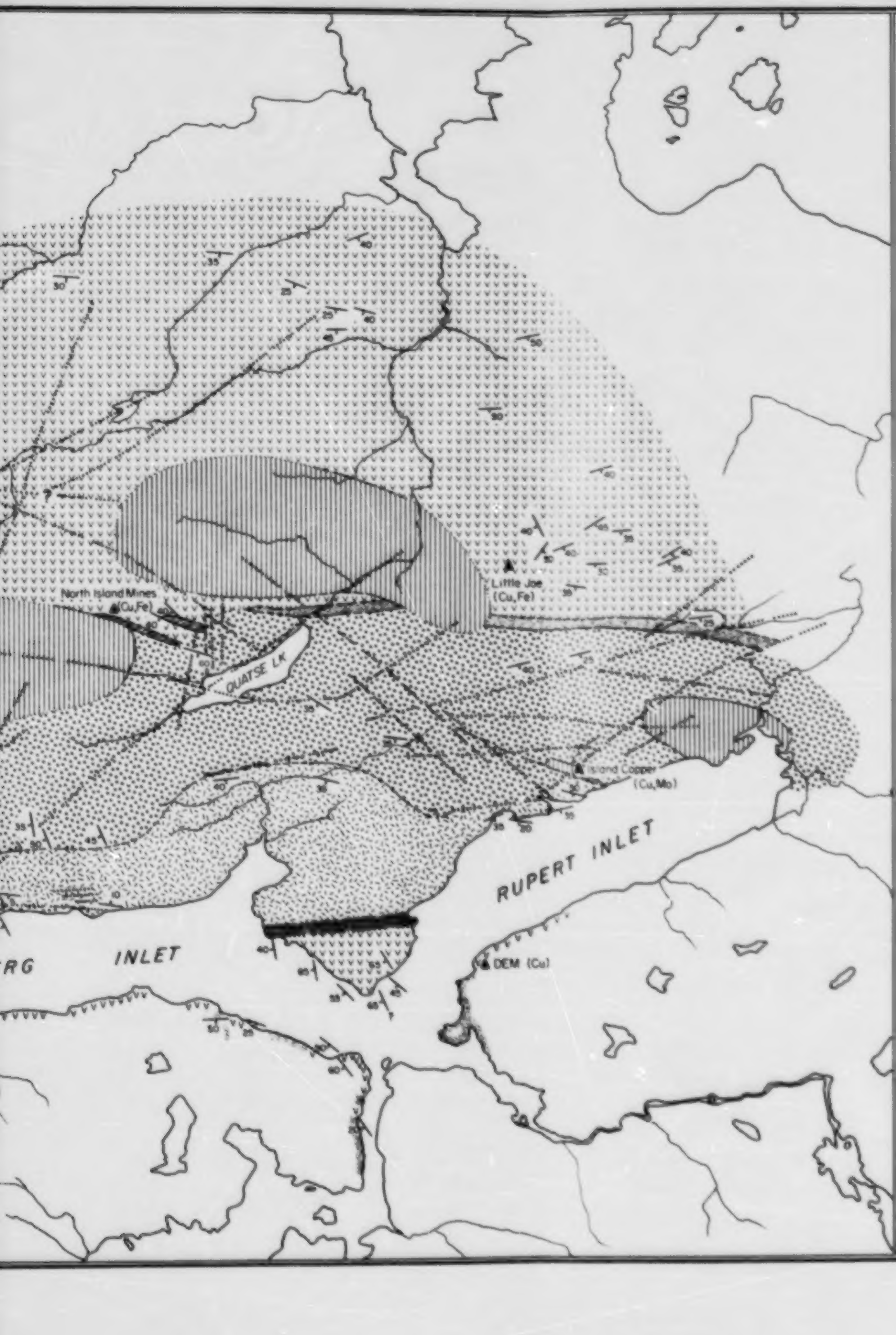


Figure 29

PRELIMINARY GEOLOGICAL MAP
RUPERT INLET – CAPE SCOTT AREA

GEOLOGY BY K.E. NORTHCOTE

0 1 2 3
SCALE-MILES

LEGEND

▥ **INTRUSIVE ROCKS**

VARIED COMPOSITION FROM DIORITE TO GRANITE AND INCLUDES PORPHYRITIC PHASES

░ **LOWER CRETACEOUS SEDIMENTARY ROCKS**

CONGLOMERATE, SANDSTONE, SILTSTONE, SHALE, CARBONACEOUS HORIZONS

▒ **BONANZA SUBGROUP**

UPPER VOLCANIC UNIT, LARGELY PYROCLASTIC TUFF, LAPILLI TUFF AND TUFF BRECCIA OF ANDESITE AND BASALT COMPOSITION WITH SOME BASALT AND RHYODACITE FLOWS AT THE TOP OF THE UNIT

LOWER SEDIMENTARY UNIT, THIN BEDDED ARGILLACEOUS AND CARBONACEOUS LIMESTONE, CALCAREOUS SHALE AND SILTSTONE AND GREYWACKE

▓ **QUATSINO FORMATION**

LIMESTONE, MEDIUM TO THICK BEDDED

▒ **KARMUTSEN FORMATION**

BASALTIC AMYGDALOIDAL AND MASSIVE FLOWS, INTERBEDDED TUFF, SOME PILLOW BRECCIA AND POORLY DEVELOPED PILLOWS THIN LIMESTONE BEDS NEAR TOP OF FORMATION

SYMBOLS

CONTACTS:

KNOWN
APPROXIMATE
ASSUMED

LINEAMENTS FROM AIR PHOTOGRAPHS SOME OF THESE ARE KNOWN TO REPRESENT FAULTS

BEDDING

▲ MINERAL DEPOSITS

APRIL 15, 1971

stratigraphic rather than structural. They are similar to Quatsino limestone and there is some question whether or not the sequence between and above these limestones should be included with Quatsino Formation. These intervolcanic limestones are tentatively included with the Karmutsen Formation.

In the vicinity of plutons the limestones are recrystallized to coarse-grained, sugary textured marble; and skarn is developed within the limestones or at their contacts with volcanic rocks. Chalcopyrite and magnetite are commonly associated with skarn.

Quatsino Formation

Two belts of Quatsino limestone occur within the Rupert Inlet-Cape Scott map-area. The most southerly and thickest belt corresponds to Muller's central belt and has been estimated to be over 2,500 feet thick in the Alice Lake section (*see* Muller, 1970, p. 44; Muller and Rahmani, 1970, p. 11). However, the possibility of repetition of formation by faulting is recognized, particularly on the south side of Holberg Inlet, and there the total thickness is in doubt. The northerly belt appears to have thinned considerably from an estimated 900 feet in the Beaver Cove section (*see* Muller, 1970, p. 44; Muller and Rahmani, 1970, p. 11) to an estimated 200 to 300-foot thickness north of Rupert Inlet. Some repetition or loss of section by faulting is possible north of Rupert Inlet.

In the vicinity of intrusive rocks the Quatsino limestone may be recrystallized to marble, silicified, or have skarn developed within it or along its contacts with Karmutsen volcanic rocks. Chalcopyrite and magnetite mineralization commonly occurs in skarn. Lead, zinc, and silver mineralization may occur with siliceous alteration in limestone.

Bonanza Subgroup

The Bonanza Subgroup ranges from Upper Triassic to upper part of Lower Jurassic age and is subdivided into two major units, a lower sedimentary unit and an upper volcanic unit. The lower sedimentary part consists of thin-bedded, black, argillaceous, carbonaceous limestone, calcareous shale, siltstone, and greywacke.

There may be sudden lateral changes of lithology within the upper volcanic unit. No specific marker horizons have been recognized that could be traced laterally for any appreciable distance. In general, however, the lower part of the upper unit consists of bedded and massive tuff. Higher in this unit the tuff loses its sedimentary aspect and consists of massive tuff, lapilli tuff, and tuff breccia with some interbedded lava flows. Refractive indices of fused beads of these rocks indicate compositions ranging from andesite to basalt. Sills and dykes of andesitic and basaltic composition are very common and probably represent feeders for flows and pyroclastic rocks higher in the section. In the upper part of the Bonanza rhyodacite flows and breccias become numerous and are interbedded with andesitic and basaltic flows, tuffs, and tuff breccias. The rhyodacite flows are thinly laminated or porphyritic and massive, and are commonly pyritized. They may be comagmatic with the more felsic of the intrusive stocks on the Rupert Inlet-Stranby River belt.

Lower Cretaceous Strata

The Lower Cretaceous strata consist of conglomerate, sandstone, siltstone, shale with carbonaceous horizons, and a few thin coal seams. These rocks crop out on the north shore of Rupert Inlet, in the Coal Harbour area, along the north shore of Holberg Inlet, and on the north coast in Stranby Valley. They unconformably overlie rocks of the Vancouver Group and are regarded as Lower Cretaceous by J. A. Jeletzky and J. E. Muller of the Geological Survey of Canada (*see* Muller, 1969, p. 28; 1970, p. 47, and Jeletzky, 1969, pp. 129–131; 1970, pp. 211, 212).

Intrusive Rocks

(*a*) *Diorite/Quartz monzonite*—The presence of a shallow batholith underlying the map-area is suggested by:

- (i) A belt of intrusive stocks extending from Rupert Inlet northwesterly to the mouth of the Stranby River. Preliminary potassium/argon age determinations indicate a mid-Jurassic age for these plutons. They have varied texture and composition, ranging from diorite to quartz monzonite, and may represent different phases of the same batholith. The more basic stocks probably represent magma contaminated by wallrock.
- (ii) Widespread propylitic alteration, and locally argillic alteration, pyrophyllitization, or silicification of Bonanza rocks along the northwesterly trend suggests hydrothermal activity emanating from shallow, underlying siliceous intrusives.
- (iii) Skarn and zones of silicification are developed in Quatsino limestone, Karmutsen basalt, and limestone in the upper part of the Karmutsen Formation along this trend.

(*b*) *Quartz feldspar porphyry*—Quartz feldspar porphyries contain coarse-grained quartz and feldspar phenocrysts in a fine-grained, siliceous, and feldspathic matrix. They are commonly extensively altered and pyritized. At Island Copper these porphyries are enveloped by altered, brecciated, mineralized Bonanza wallrocks. The porphyries, too, are cut by siliceous veins, pyritized, extensively altered, and are mineralized where they have been brecciated. The quartz feldspar porphyries are thought to be differentiates of Middle Jurassic, felsic, intrusive rocks.

(*c*) *Felsite (rhyolite) dykes and sills*—Felsite dykes and sills cut Karmutsen basalt, Quatsino limestone, and the lower part of the Bonanza Subgroup. These occur mainly in the vicinity of acid intrusives near Nahwitti Lake. They are believed to be offshoots from felsic intrusives.

(*d*) *Mafic intrusives*—Mafic dykes, sills, and small stocks(?) of gabbroic to andesitic composition cut Karmutsen flows, Quatsino limestone, and Bonanza sedimentary and pyroclastic rocks. These intrusive rocks may represent Karmutsen, Bonanza, and later feeders.

(*e*) *Basalt/Dacite dykes*—Basalt to dacitic(?) dykes cut Lower Cretaceous sediments. A small plug of similar composition cuts Lower Cretaceous rocks at Christensen Point. These intrusives have not yet been seen in association with significant zones of alteration and mineralization.

REGIONAL METAMORPHISM

A very low grade of regional metamorphism has been superimposed on basalt of the Karmutsen Formation. Pervasive chloritization and epidotization of Karmutsen rocks occur, commonly with alternating chlorite and epidote-rich beds and as blotchy epidote-rich zones surrounded by chloritic material possibly outlining former pillow structures. Clots and veinlets of epidote, carbonate, and zeolite fracture-fillings, pumpellyite, epidote, quartz, and zeolite amygdules are common.

Chloritization and epidotization of Bonanza rocks are less conspicuous than for Karmutsen rocks, but occur locally. Zeolite (laumontite) and calcite veins and fracture-fillings are most common in the Bonanza Subgroup. In many places resinous, black pyrobitumen fills fractures and cavities in Bonanza rocks.

ALTERATION

The most striking alteration is the scattered but fairly widespread zones of propylitic alteration and more local argillic, pyrophyllitic, and siliceous alteration of Bonanza rocks along the northwesterly trend of acid intrusive stocks extending from the east end of Rupert Inlet to the mouth of the Stranby River. This alteration is thought to result from hydrothermal solutions emanating from shallow, underlying siliceous intrusives. Such altered rocks occur at Island Copper, Apple Bay, Wanokana Creek, Pemberton Hills, Hep property southwest of Nahwitti Lake, Red Dog property north of Holberg, and on the southwest crest of the plateau east of Stranby Valley. In some places silicification is intense, with the resulting rock consisting of over 90 per cent silica but with original textures of the rock still visible. Adjacent to some intrusive bodies the Bonanza rocks appear to be recrystallized and metamorphosed to hornblende (biotite) hornfels.

Intrusive contacts or proximity to intrusive stocks result in quite a different kind of alteration in Karmutsen basalts, limestone, and Quatsino limestone. In these rocks the result of intrusive activity is silicification or development of skarn consisting of epidote, garnet, actinolite, diopside, ilvaite, hedenbergite, and other calcium silicate minerals. Limestone is commonly recrystallized to medium to coarse-grained marble.

The belt of intrusive stocks and the accompanying hydrothermal alteration, silicification, and development of skarn occurring between Rupert Inlet and the mouth of the Stranby River is one of very high mineral potential. Not only are most of the known significant mineral deposits of the map-area located along this trend but the abundance of smaller occurrences and widespread alteration suggest that other important deposits may still be found.

STRUCTURE

The north end of Vancouver Island is in a block faulting structural environment with post-Lower Cretaceous, northwesterly trending faults apparently the major system. This system causes both repetition and loss of parts of the stratigraphic section. Because the strike of these faults is approximately parallel to that of the bedding, lateral displacements on these faults are difficult to detect. In order to cause repetition and loss of large parts of the section, aggregate movement in a vertical sense must be in the order of hundreds to thousands of feet. The most significant of these fault systems follows Holberg Inlet, with one branch passing through the west side of Stranby Valley and another branch continuing westerly toward San Josef Bay. Another northwesterly/westerly system passes through William Lake and Fisherman River and still another smaller system passes through Nahwitti Lake (*see* Fig. 29).

Northeasterly trending faults seem to be the next most important system. In some cases apparent lateral displacement, in the order of a few hundred feet, can be measured on certain horizons. Sense of movement, however, could be entirely vertical with the apparent offset resulting from regional dip of the beds.

The regional dip of bedding is generally gentle to moderate southwesterly. Locally, in the area west of Holberg, dips are much steeper, but these are in close proximity to major faults. There is little folding or flexuring of bedding visible except along locii of major faults where it is particularly conspicuous in thin-bedded sediments of Lower Bonanza. Bedding is generally inconspicuous in massive beds of Karmutsen, Quatsino, and Bonanza rocks; particularly inland where outcrops are widely scattered and covered by vegetation. In view of the prevalence of faulting it is probable that the map-area is structurally more complex than it initially appears.

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CS, CID, RAN (No. 63, Fig. G)

LOCATION: Lat. 50°41–51′ Long. 128°04.5–18′ (102I/9E, 16E, 16W)
The property covers an area of approximately 50 square miles in the Cape Scott area, at the extreme northwest tip of Vancouver Island.

CLAIMS: CS, CID, RAN groups, consisting of 1,058 full-size claims and fractions.

ACCESS: By helicopter from Port Hardy, 35 miles southeast of the CS group.

OWNER: QUINTANA MINERALS CORPORATION, 1215, 555 Burrard Street, Vancouver 1.

METALS: Copper, iron.

DESCRIPTION: Mineralization occurs as (1) pyrometasomatic copper-iron deposits in the Karmutsen volcanics near the mouth of Stranby River, and (2) quartz-sulphide fracture veins east and north of Williams Lake.

WORK DONE: During 1969 a work programme costing approximately $300,000 was carried out. Most of the work consisted of road-building and bulldozer-stripping, geochemical sampling of soils and rocks, visual prospecting, and geological mapping. No zones of significant mineralization were reported.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 200; Assessment Reports 1847, 2383.

H, A (No. 78, Fig. G)

LOCATION: Lat. 50°45′ Long. 128°04′ (102I/9E)
East of Stranby River, on south slopes of Knob Hill, 7 miles northwest of Holberg.

CLAIMS: H, A, totalling 71.

ACCESS: The south end of the claim group is accessible by forest access and logging road, approximately 45 miles from Port Hardy.

OPERATOR: CHALLENGER MINES LTD., 201, 714 West Hastings Street, Vancouver 1.

WORK DONE: Geological, geochemical soil, and magnetometer surveys were conducted on the H and A claims during 1969 and 1970.

REFERENCE: Assessment Report 2645.

HOL (No. 65, Fig. G)

Location:
Lat. 50°40–40.5′ Long. 127°59′ to 128°01.5′ (92L/12W, 102I/9E)
Approximately 20 miles west of Port Hardy and 2 miles north of Holberg.

Claims: HOL 1 to 20, 25 to 34, 37 to 47.

Access: By logging-road, 2 miles north of Holberg.

Owner: NICOLA LAKE MINING CO. LTD., 1322, 777 Hornby Street, Vancouver.

Metal: Copper.

Work done: Geological, geochemical soil, and magnetometer surveys were carried out along all roads traversing the property.

References: Assessment Reports 1770, 2276.

H (No. 54, Fig. G)

Location: Lat. 50°38′ Long. 127°54′ (92L/12W)
Between sea-level and 1,900 feet elevation at Clesklagh Creek, on the north side of Holberg Inlet, 15 miles west of Coal Harbour.

Claims: H 1 to 32.

Access: From Coal Harbour by boat, 15 miles.

Owner: V. Bragg.

Operator: D. K. BRAGG, 3567 West 27th Avenue, Vancouver 8.

Metal: Copper.

Description: Chalcopyrite disseminated in Bonanza volcanics.

Work done: Topography mapped; surface geological mapping, 1 inch equals 400 feet; geochemical soil survey, 747 samples covering H 1 to 32.

KW (No. 55, Fig. G)

Location: Lat. 50°37–38′ Long. 127°47–53′ (92L/12W)
Between sea-level and 1,800 feet on the north side of Holberg Inlet, 8½ to 14 miles west of Coal Harbour.

Claims: KW 11 to 16, 39 to 96.

Access: From Coal Harbour or Holberg by boat or from Port Hardy by float-equipped plane.

Owners: D. W. TIBBOTT and D. K. BRAGG, 3567 West 27th Avenue, Vancouver 8.

Metal: Copper.

Work done: Topography mapped; surface geological mapping, 1 inch equals 400 feet; and geochemical soil survey, 1,238 samples covering all claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 202; Assessment Reports 1929, 2521.

RED DOG (No. 62, Fig. G)

By K. E. Northcote

Location: Lat. 50°43′ Long. 127°58′ (92L/12W)
Between 700 and 1,500 feet elevation, 10 miles north of Holberg.

Claims: RED DOG, totalling 56.

Access: By logging-road from Holberg, 10 miles.

Operator: WEST COAST MINING & EXPLORATION, 205, 122 East 14th Street, North Vancouver.

Metals: Copper, molybdenum.

DESCRIPTION:

The mineralization on the Red Dog property occurs within the upper sedimentary part and the lower bedded pyroclastic part of the Bonanza Subgroup within the belt of intrusive stocks extending from Rupert Inlet to the mouth of the Stranby River. The Bonanza rocks are intricately intruded by diorite, quartz diorite, and leucocratic porphyries. Hornfels occurs in contact zones and the more siliceous intrusions caused widespread silicification and hydrothermal alteration. Copper and molybdenite mineralization occurs mainly in hornfels in contact zones and to a lesser extent in siliceous breccias. All rock units are extensively sheared and faulted.

Bonanza Subgroup

The Bonanza rocks consist of bedded tuff, massive tuff, lapilli tuff, and tuff breccia of andesitic and basaltic composition, as determined from refractive indices of fused beads.

Intrusive Complex

The intrusive complex consists of a number of phases of different texture and composition.

(*a*) *Diorite and porphyritic diorite*—Medium-grained, green-grey diorite and porphyritic diorite, probably feeder dykes and zones for flows higher in the Bonanza section, are clearly in intrusive contact with Lower Bonanza bedded and massive tuff.

(*b*) *Red Dog porphyry*—The Red Dog porphyry is of granodiorite to quartz diorite composition containing coarse-grained, rounded quartz phenocrysts and euhedral to subhedral plagioclase. This porphyritic phase shows wide variation in amount of mafic minerals present, possibly resulting from varied incorporation and assimilation of Bonanza andesite or basalt.

(*c*) *Leucocratic quartz feldspar porphyry*—Leucocratic quartz feldspar porphyry appears to be a differentiate of Red Dog porphyry. This phase occurs as a distinct body on Red Dog claims (*see* Fig. 30). It consists of coarse-grained quartz and feldspar phenocrysts in a fine-grained siliceous and feldspathic matrix. It is commonly extensively altered and contains disseminated pyrite. Similar-appearing rock occurs in shear zones within other intrusive and Bonanza rocks.

(*d*) *Other intrusive rocks*—A knob of granitic rock west of pit No. 3 consists of medium-grained quartz-rich quartz feldspar porphyry and light to medium grey "crowded" porphyry. These intrusive rocks differ in texture from other intrusive rocks on the Red Dog property.

Structure

Bedding, wherever visible, strikes northwesterly and dips moderately southwesterly. No major folding was observed apart from minor flexuring in the vicinity of shear zones.

All rock units are abundantly sheared and fractured. Many major faults and shear zones cross the property and some of these may be represented by topographic lineaments on Figure 30. The most notable shear zone, however, trends northwesterly and roughly marks a division line between two distinct geological areas.

Alteration and Metamorphism

On the northeast side of the property the Bonanza rocks are metamorphosed to hornblende (biotite) hornfels with some silicification and hydrothermal alteration in shear zones. On the southwest side of the property, on the other hand, the Bonanza rocks have been either intensely silicified and brecciated or show pyro-

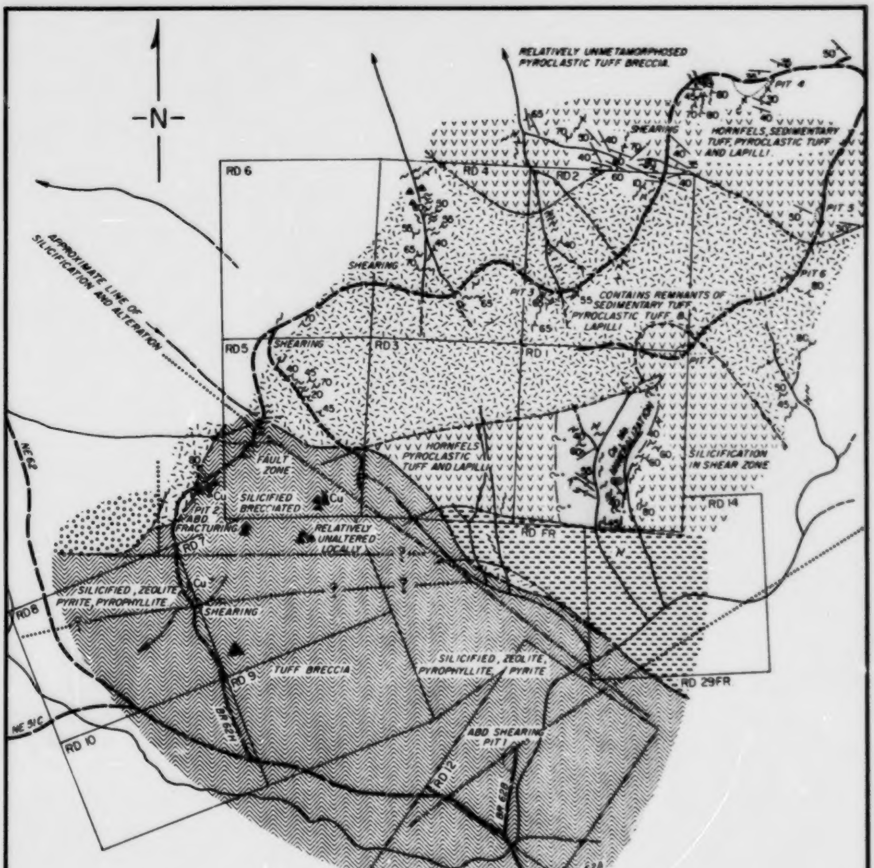

N
RELATIVELY UNMETAMORPHOSED PYROCLASTIC TUFF BRECCIA
HORNFELS, SEDIMENTARY TUFF, PYROCLASTIC TUFF AND LAPILLI
SHEARING
PIT 4
PIT 5
PIT 6
PIT 7
PIT 3
PIT 2
PIT 1
CONTAINS REMNANTS OF SEDIMENTARY TUFF, PYROCLASTIC TUFF & LAPILLI
APPROXIMATE LINE OF SILICIFICATION AND ALTERATION
RD 6
RD 4
RD 2
RD 5
RD 3
RD 1
RD 7
RD 8
RD 9
RD 10
RD 11
RD 12
RD 14
RD FR
RD 29FR
NE 62
NE 51C
BR 62H
BR 62B
BR 62A
HORNFELS PYROCLASTIC TUFF AND LAPILLI
SILICIFICATION IN SHEAR ZONE
FAULT ZONE
SILICIFIED BRECCIATED
AND FRACTURING
RELATIVELY UNALTERED LOCALLY
Cu
SILICIFIED, ZEOLITE, PYRITE, PYROPHYLLITE
TUFF BRECCIA
SILICIFIED, ZEOLITE, PYROPHYLLITE, PYRITE
AND SHEARING
0 400 800 1,200 1,600
SCALE-FEET
BONANZA SUBGROUP
THIN BEDDED TUFF, LAPILLI TUFF, TUFF BRECCIA.
SILICIFIED AND ALTERED TUFF / TUFF BRECCIA. SILICA, SERICITE, PYROPHYLLITE, PYRITE, ZEOLITE (Laumontite) ARGILLIC (Dickite, Illite)
FAULTS AND SHEARS
TOPOGRAPHIC LINEAMENTS
BEDDING
INTRUSIVES
RED DOG PORPHYRY INTRUDING RED DOG DIORITE & PORPHYRITIC DIORITE.
LEUCOCRATIC QUARTZ FELDSPAR PORPHYRY.
LEUCOCRATIC PORPHYRY & CROWDED PORPHYRY
GEOLOGY BY K.E. NORTHCOTE 1970

Figure 30. Geology of the Red Dog property.

phyllite, pyrite, sericite, and argillic alteration. On the southwest side of the property it is only locally possible to determine original textures of the rocks and, hence, their origin.

Mineralization

Pyrite is abundant throughout metamorphosed and hydrothermally altered Bonanza rocks and is common in all phases of the intrusives. It occurs as fracture-fillings, is disseminated in fractures, and is disseminated throughout the rock matrix. In some stream beds limonite gossans several inches thick are formed.

Chalcopyrite and molybdenite mineralization is more localized. On the northeast side of the property the area of best mineralization is outlined on Figure 30. Chalcopyrite occurs as very fine-grained disseminations and in fractures in hornfels. Molybdenite is most abundant on fracture surfaces and in quartz-sericite veins following shear zones. (Assay results from drill core will be made available for publication after the company has evaluated the deposit.) On the southwest side of the property, copper mineralization is more sporadic, occurring mainly in association with magnetite in siliceous breccia.

WORK DONE: Ground magnetometer survey covering Red Dog 1 to 24 claims; surface diamond drilling, four holes totalling 1,500 feet on Red Dog 5, 7, and 8 claims.

MO, MOM, BUD, TI (No. 80, Fig. G)

LOCATION: Lat. 50°43′ Long. 127°55′ (92L/12W)
Two miles west of Nahwitti Lake, at approximately 1,200 feet elevation.

CLAIMS: MO, MOM, BUD, TI, totalling 49.

ACCESS: By forest access and logging roads from Port Hardy, 20 miles.

OWNER: ACHERON MINES LTD., 201 714 West Hastings Street, Vancouver 1.

WORK DONE: Geological, geochemical soil, and magnetometer surveys were conducted.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 96; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 201; Assessment Reports 1762, 2820.

HEP, EXPO (No. 23, Fig. G)

LOCATION: Lat. 50°36–43′ Long. 127°41′ to 128°00′ (92L/12E, 12W)
From 1,300 to 1,800 feet elevation, between the north side of Holberg Inlet and Nahwitti Lake.

CLAIMS: HEP, EXPO, DON, totalling 822 claims and fractions.

ACCESS: By road and helicopter from Port Hardy, 32 miles.

OWNER: UTAH CONSTRUCTION & MINING CO., 412, 510 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Mineralization consists mainly of disseminated chalcopyrite with molybdenite in fractures in propylitized, silicified, fractured, and sheared granodiorite, and andesite and tuff of the Bonanza Subgroup.

WORK DONE: Topography and surface workings mapped; surface geological mapping, 1 inch equals 200 feet on 15 Hep claims; induced polarization survey, 15.82 line-miles covering nine Hep claims, Don 7 Fraction, and 15 Expo claims; magnetometer survey, 10.31 line-miles covering 15 Expo claims, six Hep claims, and Don 1 Fraction; road construction, 2½ miles in the Nahwitti Lake-Holberg area; surface diamond drilling, two holes totalling 750 feet on Hep 1 and 2.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, p. 64; 1967, p. 68; 1968, p. 95 (Hep), p. 96 (Expo); *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 202; Assessment Reports 684, 1621A, 1621B, 2190.

HPH, NORMAN (No. 27, Fig. G)

LOCATION: Lat. 50°42′ Long. 127°47′ (92L/12W)
At approximately 800 feet elevation, south and east of Nahwitti Lake.

CLAIMS: HPH, NORMAN, and AUDREY groups.

ACCESS: By road from Port Hardy, 17 miles.

OWNER: GIANT EXPLORATIONS LIMITED, 1131 Melville Street, Vancouver 5.

METALS: Silver, lead, zinc, copper.

DESCRIPTION: Fracture-filling and replacement in Quatsino limestone.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet; induced polarization survey, 4 line-miles; geochemical soil survey, 99 samples covering Rain, Silva, Audrey, and Amy claims.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1930, p. 297; 1931, p. 171; 1932, p. 207; 1936, pp. F47–F49; 1966, pp. 63, 64; 1968, p. 95; *Geol. Surv., Canada,* Sum. Rept., 1931, Pt. A, pp. 36–45; Assessment Reports 30, 2205, 2796.

SILVA (No. 72, Fig. G)

LOCATION: Lat. 50°41.5′ Long. 127°44′ (92L/12E)
South and east of Nahwitti Lake.

CLAIMS: SILVA 7, 13 (part of the HPH group, but at east end).

ACCESS: By 27 miles of forest access and logging road from Port Hardy.

OPERATOR: GIANT EXPLORATIONS LIMITED, 1131 Melville Street, Vancouver 5.

WORK DONE: Two line-miles of induced polarization survey.

REFERENCE: Assessment Report 2796.

HAW, WIT, CIA (No. 73, Fig. G)

LOCATION: Lat. 50°43′ Long. 127°43.5′ (92L/12E, 12W)
Between Kains and Nahwitti Lake, 15 miles west of Port Hardy.

CLAIMS: HAW, WIT, CIA, VIN, PLUG, totalling 79.

ACCESS: From Port Hardy by Nahwitti Lake forest access road.

OWNER: CONTINENTAL CINCH MINES LTD., 1790, 777 Hornby Street, Vancouver 1.

METALS: Copper, zinc.

WORK DONE: A geochemical soil survey, geological mapping, scale 1 inch to 400 feet, and a magnetometer survey were carried out.

REFERENCE: Assessment Report 2815.

A, B, X (No. 59, Fig. G)

LOCATION: Lat. 50°40′ Long. 127°42′ (92L/12E)
At approximately 1,500 feet elevation, in the headwaters of Wanokana Creek, north of Holberg Inlet and south of Kains Lake, 9 miles west-southwest of Port Hardy.

CLAIMS: A 5 to 26, B 1 and 3, X 2 to 8.

Access: By British Columbia forestry road for approximately 12 miles west of Port Hardy, southeast along a logging-road for 1½ miles, then on foot for 2 miles to the northern edge of the claim group.

Owner: ELECTRA MINES LTD., 1257 Douglas Street, Prince George.

Work done: Surface trenching, over 300 feet on A 8, 15, and 17 claims.

ADD, MOR, WOB (No. 9, Fig. G)

Location: Lat. 50°41.6′ Long. 127°41′ (92L/12E)
At approximately 1,000 feet elevation, on south shore of Kains Lake.

Claims: ADD 1 to 5, MOR 1 to 38, WOB 1 to 58.

Access: By British Columbia forestry access road from Port Hardy, 15 miles.

Owner: THE SWISS ALUMINIUM MINING CO. OF CANADA LTD., 202, 717 West Pender Street, Vancouver 1.

Metals: Gold, silver, lead, zinc, copper, iron.

Description: The east half of the claim block is underlain from north to south by a succession of Karmutsen volcanic flows and tuffs, Quatsino limestone, and thin-bedded calcareous shale and massive tuffs of the lower Bonanza Subgroup. To the south this succession is in fault contact with Karmutsen Formation. The west half of the claim block is largely underlain by Karmutsen Formation. Mineralization is reported in skarn within marble associated with intrusive andesitic-gabbroic dykes.

Work done: Claims and surface workings mapped in part (30 claims); topography mapped; surface geological mapping, 1 inch equals 400 feet on Wob 47 to 50 and 1 inch equals 400 feet on Add 1 to 4 and Mor 1 to 8, 35, 36; induced polarization surveys, 4½ line-miles covering Wob 47 to 50 and 18 line-miles covering Add 1 and 2 and Mor 1 to 6, 11, 12, 19, 20, 35, 36.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 85 (regional geology, Fig. 13); Assessment Reports 1719, 2208, 2787.

M, EM, TREC (No. 41, Fig. G)

Location: Lat. 50°41′ Long. 127°38′ (92L/12E)
At approximately 1,500 feet elevation, northwest of Quatse Lake, extending from Bluebell Creek north-northwesterly to Dick Booth Creek.

Claims: M 1 to 21, EM 1 to 18, TREC 1 to 16.

Access: From Port Hardy by Nahwitti Lake road and thence by logging-road. Total distance from Port Hardy to north end of claim block is approximately 12 miles.

Owner: METEOR MINING CO. LTD., 574 Yates Street, Victoria.

Metals: Copper, molybdenum, zinc.

Description: Claims at the north end of the block are on Quatsino limestone and on the lower sedimentary part of the Bonanza Subgroup. This sequence is separated by faults from a sequence of Karmutsen volcanic rocks to the south. The south end of the claim block is in contaminated intrusive rocks of dioritic to granodioritic composition. Pyrite and chalcopyrite are reported in sedimentary rocks, andesite dykes, and diorite intrusions.

Work done: Geochemical soil survey, 450 samples covering part of the EM claims and Trec 1 to 8; trenching, 100 feet on M 19 and 21.

CALEDONIA, BLUEBELL, CASCADE (No. 42, Fig. G)

By K. E. Northcote

LOCATION: Lat. 50°39′ Long. 127°36.5′ (92L/12E)
Between 400 and 1,300 feet elevation north of Quatse Lake.

CLAIMS: Lots 1294 to 1296, DON, WET, BA, EH, JO, MO, IN, SANDY, KF, GRAVEL, TC, DD, totalling 143.

ACCESS: By road from Port Hardy, 8½ miles southwest.

OWNER: NORTH ISLAND MINES LTD., 574 Yates Street, Victoria.

METALS: Copper, silver, zinc, iron.

DESCRIPTION:

The northwest part of the claim block is underlain by Karmutsen basalts and minor tuffs. The Caledonia, Bluebell, and Cascade claims are at a contact between contaminated siliceous intrusives on the south and with Quatsino limestone and Karmutsen volcanics on the north. The northeastern part of the claim block is underlain by Karmutsen volcanics intruded by quartz diorite (*see* Fig. 29). To the south of this intrusive body is the upper part of the Karmutsen volcanics, the Quatsino limestone, and, at Quatse Lake, the sedimentary part of the lower Bonanza Subgroup. Structural complexity and (or) dip slopes cause repetition of limestone beds.

Mineralization at the Caledonia, Bluebell, and Cascade workings consists of an epidote-garnet (amphibole) skarn containing magnetite, chalcopyrite, and sphalerite at a contact between Karmutsen volcanics, Quatsino limestone, and contaminated granodiorite. East of these workings, chalcopyrite occurs in skarn in limestone, at limestone-volcanic contacts, and in fractures in volcanics. Bornite replaces some siliceous and tuffaceous beds in the upper part of the Karmutsen Formation north of Quatse Lake.

WORK DONE: Geochemical soil survey, 220 samples covering KF claims; trenching, 2,500 feet.

EB (No. 70, Fig. G)

LOCATION: Lat. 50°36.5′ Long. 127°39.5′ (92L/12E)
At Apple Bay, 4 miles west of Coal Harbour.

CLAIMS: EB 1 to 13, 15 to 17.

ACCESS: By boat 4 miles west of Coal Harbour and thence by old logging-roads on the claim group.

OWNERS: ALTAIR MINING CORPORATION LTD. and MARSHALL CREEK COPPER CO. LTD., 310, 890 West Pender Street, Vancouver 1.

WORK DONE: A total of 16 line-miles was blazed and flagged, 327 soil samples were taken and analysed, and geological mapping, scale 400 feet to 1 inch, was performed.

REFERENCE: Assessment Report 2790.

WIZ (No. 71, Fig. G)

LOCATION: Lat. 50°37′ Long. 127°38′ (92L/12E)
Between 2½ and 4 miles northwest of Coal Harbour and approximately 1 mile north of Apple Bay on Holberg Inlet.

CLAIMS: WIZ 1 to 20, 23 to 28.

ACCESS: By foot for 1 mile from local logging-roads that branch off the Coal Harbour–Port Hardy road.

OWNERS: ALTAIR MINING CORPORATION LTD. and MARSHALL CREEK COPPER CO. LTD., 310, 890 West Pender Street, Vancouver 1.

Work done: A geochemical survey consisting of 628 samples from 26 miles of line was carried out.

Reference: Assessment Report 2791.

MAR (No. 40, Fig. G)

Location: Lat. 50°36.5′ Long. 127°36′ (92L/12E) One mile northwest of Coal Harbour.

Claims: MAR, totalling 44.

Access: By road from Port Hardy.

Owner: Marshall Creek Copper Co. Ltd.

Operator: INSPIRATION DEVELOPMENT COMPANY, N3907 Marguerite Road, Spokane, Wash.

Metals: Copper, molybdenum.

Description: Most of the property is underlain by Bonanza tuff and tuffaceous breccia. Feldspar porphyry and granodiorite intrusions are reported. Lower Cretaceous shale and conglomerate occur on the south part of the property.

Work done: Surface geological mapping; induced polarization survey, 12 line-miles; geochemical survey, 71 samples; surface diamond drilling, two holes totalling 1,402 feet on Mar 5 to 8.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 93; Assessment Report 1708.

BID, BON (No. 39, Fig. G)

Location: Lat. 50°37′ Long. 127°34.5′ (92L/12E) Coal Harbour, at approximate elevation of 200 feet.

Claims: BID 1 to 26, 28 to 40; BON 1 to 36, 41 to 44, 53 to 56, 58 to 70.

Access: By logging-road from Coal Harbour, one-half to 4 miles.

Owner: Altair Mining Corporation Ltd.

Operator: INSPIRATION DEVELOPMENT COMPANY, N3907 Marguerite Road, Spokane, Wash.

Metal: Copper.

Description: Bonanza Subgroup pyroclastics and flows intruded by quartz porphyry plugs associated with northwest fault trends. Pyritization locally.

Work done: Surface geological mapping, 1 inch equals 1,000 feet on Bid and Bon claims; induced polarization survey, 5 line-miles covering Bon 9, 11 to 14, 41 to 44; magnetometer survey, 14 line-miles covering Bid 7 to 10, 17 to 20, 28 to 30, and Bon 15, 16, 21 to 32; geochemical soil survey, 323 samples covering Bid 7 to 10, 17 to 20, 28 to 30, and Bon 15, 16, 21 to 32; surface diamond drilling, one hole totalling 1,745 feet on Bon 25.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 93; Assessment Reports 1720, 2634.

LITTLE JOE (No. 56, Fig. G)

Location: Lat. 50°38′ Long. 127°29′ (92L/11W) Six miles south of Port Hardy.

Claims: LITTLE JOE 1 to 10, 13 to 18, 34; ALICE 1 to 4; ANN 1 Fraction.

Access: From Port Hardy by logging-road, 8 miles.

Operator: YELLOWKNIFE BEAR MINES LIMITED, 360 Bay Street, Toronto, Ont.

Metals: Copper, zinc.

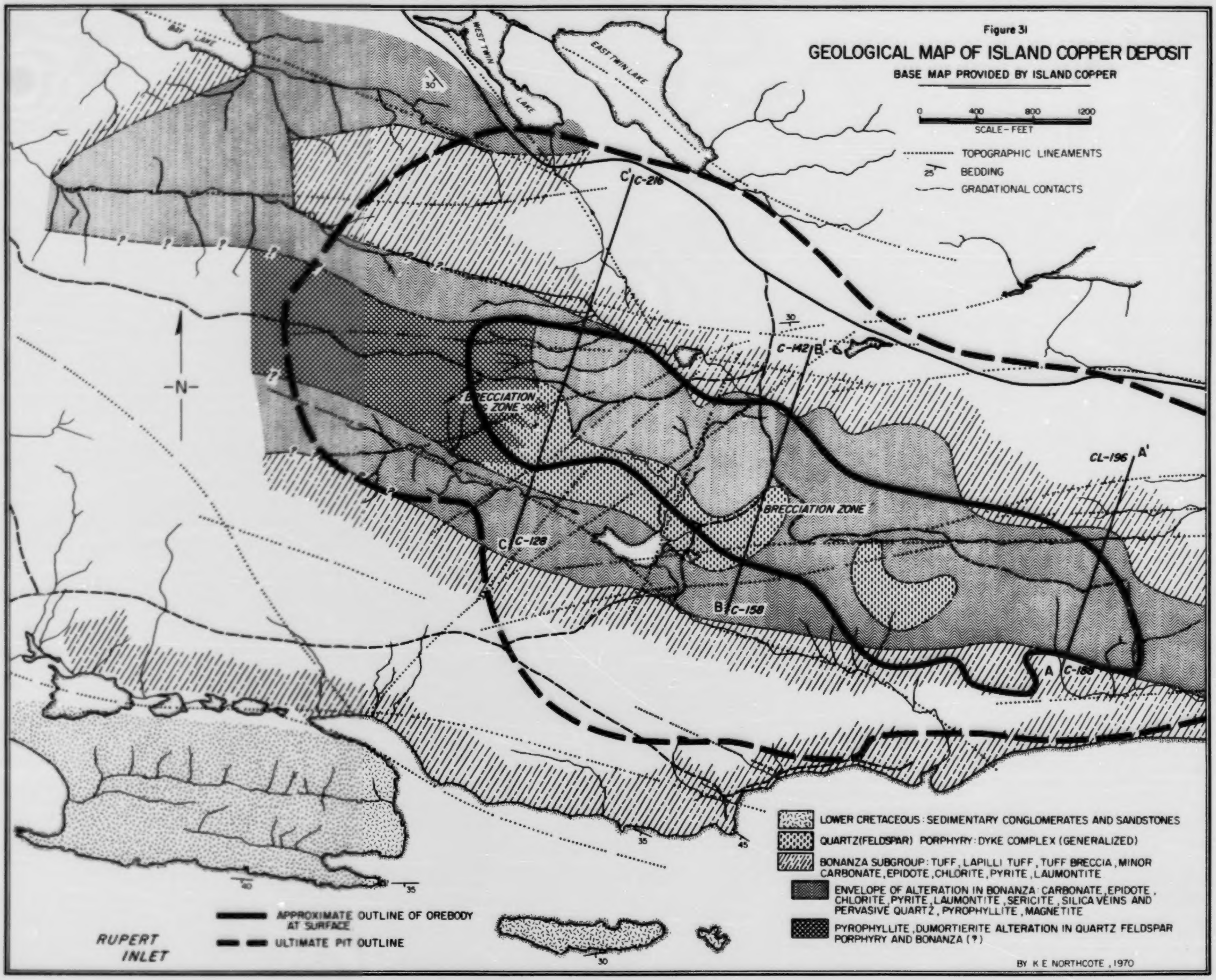


Figure 31

GEOLOGICAL MAP OF ISLAND COPPER DEPOSIT

BASE MAP PROVIDED BY ISLAND COPPER

0 400 800 1200
SCALE - FEET
TOPOGRAPHIC LINEAMENTS
25 BEDDING
GRADATIONAL CONTACTS
BAY LAKE
WEST TWIN LAKE
EAST TWIN LAKE
30
C' C-216
C-142 B'
30
BRECCIATION ZONE
BRECCIATION ZONE
CL-196 A'
C C-128
B C-158
A C-168
-N-
?
35
45
40
35
30
RUPERT INLET
APPROXIMATE OUTLINE OF OREBODY AT SURFACE
ULTIMATE PIT OUTLINE
LOWER CRETACEOUS : SEDIMENTARY CONGLOMERATES AND SANDSTONES
QUARTZ(FELDSPAR) PORPHYRY : DYKE COMPLEX (GENERALIZED)
BONANZA SUBGROUP : TUFF, LAPILLI TUFF, TUFF BRECCIA, MINOR CARBONATE, EPIDOTE, CHLORITE, PYRITE, LAUMONTITE
ENVELOPE OF ALTERATION IN BONANZA : CARBONATE, EPIDOTE, CHLORITE, PYRITE, LAUMONTITE, SERICITE, SILICA VEINS AND PERVASIVE QUARTZ, PYROPHYLLITE, MAGNETITE
PYROPHYLLITE, DUMORTIERITE ALTERATION IN QUARTZ FELDSPAR PORPHYRY AND BONANZA (?)
BY K E NORTHCOTE, 1970

DESCRIPTION: Basalts and limestone intruded by quartz diorite; chalcopyrite in skarn in limestone; disseminated chalcopyrite in volcanics and intrusives.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet; magnetometer and induced polarization surveys; and geochemical soil survey covering all claims; surface diamond drilling, 10 holes totalling 5,728 feet.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1963, p. 99; 1968, p. 90; Assessment Report 2381.

ISLAND COPPER (No. 47, Fig. G)

By K. E. Northcote

LOCATION: Lat. 50°36′ Long. 127°37′ (92L/11E, 11W)
Between sea-level and 300 feet elevation on the north side of Rupert Arm, Port Hardy.

CLAIMS: One hundred and seventy-five claims and fractions, including the BAY, COVE, JIM, COIR, RUPERT, INLET, ART.

ACCESS: From Port Hardy by road, 10 miles.

OWNER: UTAH CONSTRUCTION & MINING CO., 525, 510 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION:

Island Copper deposit lies near the east end of the belt of intrusive stocks shown on Figure 29. It is a porphyry copper deposit in which most of the mineralization occurs within brecciated rocks of the lower part of the Bonanza Subgroup. Copper and molybdenum mineralization occurs as disseminations and in veinlets in siliceous and hydrothermally altered tuff, lapilli tuff, and tuff breccia of andesite and basalt composition. The mineral deposit and altered zone envelop a locally intensely brecciated, altered, elongate swarm of moderately steeply northerly dipping quartz (feldspar) porphyry dykes and their siliceous differentiates (*see* Fig. 31). The quartz (feldspar) porphyry cuts the moderately southerly dipping Bonanza beds at a high angle.

Island Copper has reported reserves of approximately 280 million tons of 0.52 per cent copper and 0.029 per cent molybdenum sulphide. A mill is presently being constructed and overburden is being stripped from the orebody in preparation for production in 1972 (*see* Young and Rugg, 1971).

Bonanza Subgroup

The Island Copper deposit occurs within the lower volcanic, upper sedimentary part of the Bonanza Subgroup. Where bedding attitudes are visible, northwesterly strikes and gentle to moderate southwesterly dips prevail. Drill holes on the north side of the deposit show thin-bedded, siliceous tuffs (*see* Figs. 32, 33, and 34). The siliceous tuff is interbedded with and overlain by more massive tuff, lapilli tuff, and tuff breccia, of andesitic and basaltic composition. Few lava flows are recognized in this part of the section. Andesitic and basaltic rocks not of pyroclastic nature observed in core may be sills and dykes rather than flows. Shades of green-grey, green, and mottled multicolours of purplish red, purplish grey with green, and green-grey are prevalent in the pyroclastic rocks. Outside the zone of alteration the rocks are weakly chloritic, have widely disseminated pyrite grains, and contain fracture-fillings of zeolites (laumontite), carbonate, and lesser amounts of quartz and epidote.

Quartz (Feldspar) Porphyry

An elongate swarm of quartz (feldspar) porphyry dykes trends northwesterly across the property and appears to have originated from one or more larger porphyry bodies at shallow depth (*see* Figs. 31 and 32). Large, rounded, resorbed quartz phenocrysts, characteristic of this porphyry, and large clots of fine-grained sericite and (or) pyrophyllite are set in a very fine-grained, siliceous matrix. The fine-grained siliceous matrix also contains flecks of sericite or pyrophyllite and carbonate. Where the porphyry has been brecciated, veined by quartz, and silicified, it is commonly mineralized by pyrite and chalcopyrite. A brecciated zone of intensely hydrothermally altered dumortierite and pyrophyllite occurs along the quartz (feldspar) porphyry trend at the northwest side of the deposit (*see* Fig. 31). This intensely altered zone may in part be altered quartz (feldspar) porphyry.

Structure

Bedding, where visible in Bonanza rocks, strikes northwesterly and has gentle to moderate southwesterly dips. The quartz (feldspar) porphyry was apparently emplaced along a steep to moderate northerly dipping shear zone which cuts the bedding at a high angle (*see* Fig. 34). Late shear zones are evident in core and in present exposures trend north 70 degrees west or north 50 degrees east (*see* Young and Rugg, 1971) and contain gouge and argillic (illite) alteration.

An extremely complicated and incompletely solved history of fracturing and brecciation is evident in core and rock exposures overlying and flanking the quartz (feldspar) porphyry complex. Fragments of quartz (feldspar) porphyry, bedded and massive tuff, tuff breccia, etc., cut by quartz veinlets, form a breccia in a siliceous, sericitic(?) matrix which is cut by at least two generations of quartz veins. This breccia appears to have been locally rebrecciated, healed by dumortierite, brecciated, healed by pyrophyllite, and brecciated again. Some of the fracturing and brecciation is undoubtedly the result of shearing and movement in fault zones. However, proximity to quartz (feldspar) porphyries, the large variety of rock fragments its contains (including quartz (feldspar) porphyry), and the locally low fragment to matrix ratio suggest explosive brecciation during and following emplacement and crystallization of quartz (feldspar) porphyry. Some siliceous differentiates of the porphyry permeated the brecciated rocks and altered and mineralized them. Other siliceous veins are unmineralized.

Alteration

There is an apparent zoning of the types of alteration from the outside of the alteration envelope toward its core, but the pattern is obscured by more intense or different kinds of alteration in localized zones, presumably following shear zones. However, the outer margins of the altered zone generally show an increase in amount of pervasive carbonate, sericite, and pyrite. Clots of epidote are conspicuous on some weathered surfaces. Carbonate and zeolite veins become more numerous, and some quartz veins occur. Progressing inwards there is an increase in number of quartz veins, intensity of chloritization, and sericitization. Silicification becomes more pervasive near the quartz (feldspar) porphyry swarm. In addition, Young and Rugg report hydrothermal orthoclase and biotite (Young and Rugg, 1971). Dumortierite and pyrophyllite occur in a zone of intense alteration occurring on the northwest side of the ore zone, as outlined at the present time. (The presence of dumortierite and pyrophyllite were both confirmed by X-ray powder photographs at the British Columbia Department of Mines and Petroleum Resources

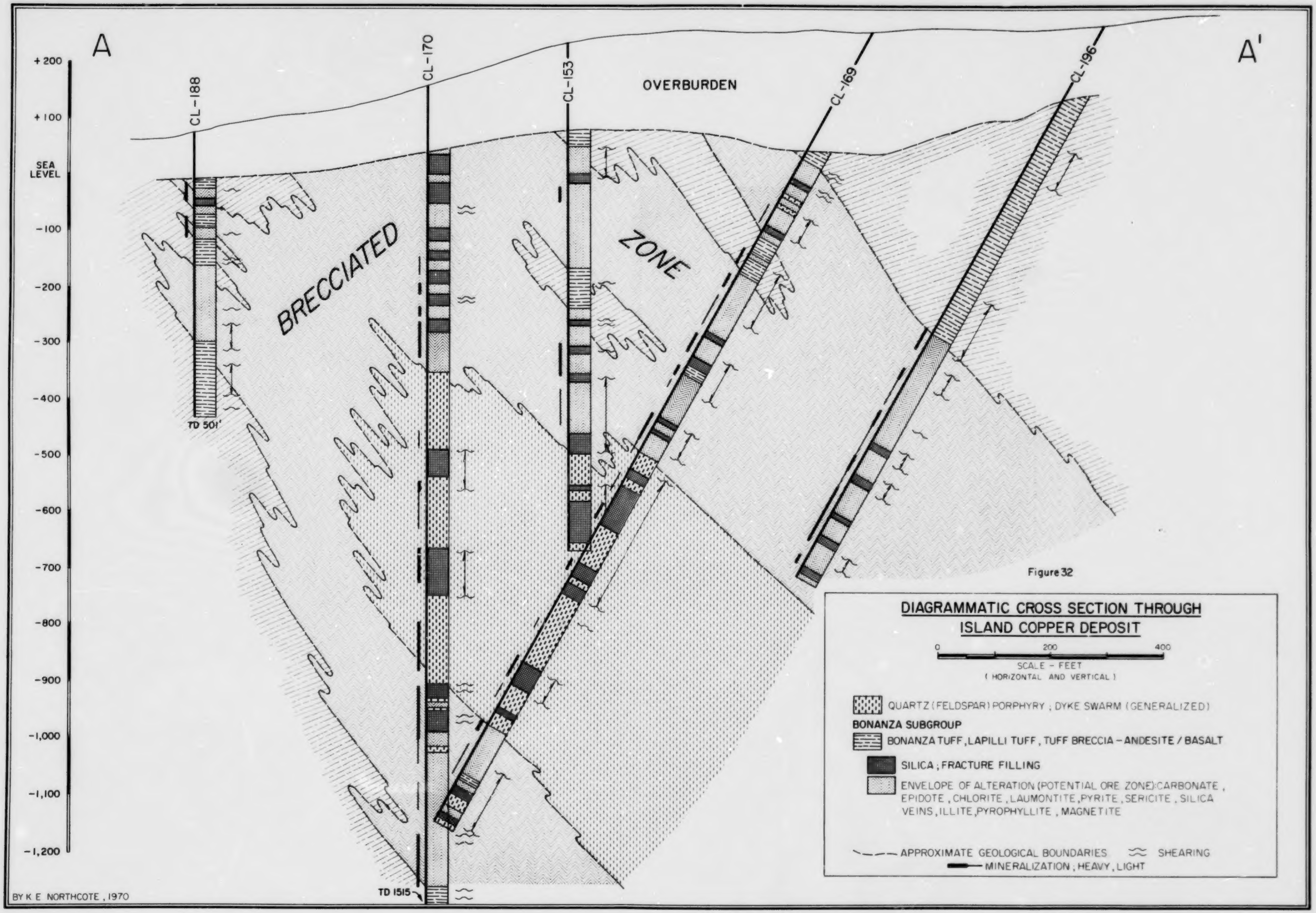


Figure 32

DIAGRAMMATIC CROSS SECTION THROUGH ISLAND COPPER DEPOSIT

A
A'
+200
+100
SEA LEVEL
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1,000
-1,100
-1,200
CL-188
CL-170
CL-153
CL-169
CL-196
OVERBURDEN
BRECCIATED
ZONE
TD 501'
TD 1515
0
200
400
SCALE - FEET
(HORIZONTAL AND VERTICAL)
QUARTZ (FELDSPAR) PORPHYRY ; DYKE SWARM (GENERALIZED)
BONANZA SUBGROUP
BONANZA TUFF, LAPILLI TUFF, TUFF BRECCIA - ANDESITE / BASALT
SILICA ; FRACTURE FILLING
ENVELOPE OF ALTERATION (POTENTIAL ORE ZONE): CARBONATE, EPIDOTE, CHLORITE, LAUMONTITE, PYRITE, SERICITE, SILICA VEINS, ILLITE, PYROPHYLLITE, MAGNETITE
APPROXIMATE GEOLOGICAL BOUNDARIES
SHEARING
MINERALIZATION, HEAVY, LIGHT
BY K.E. NORTHCOTE, 1970

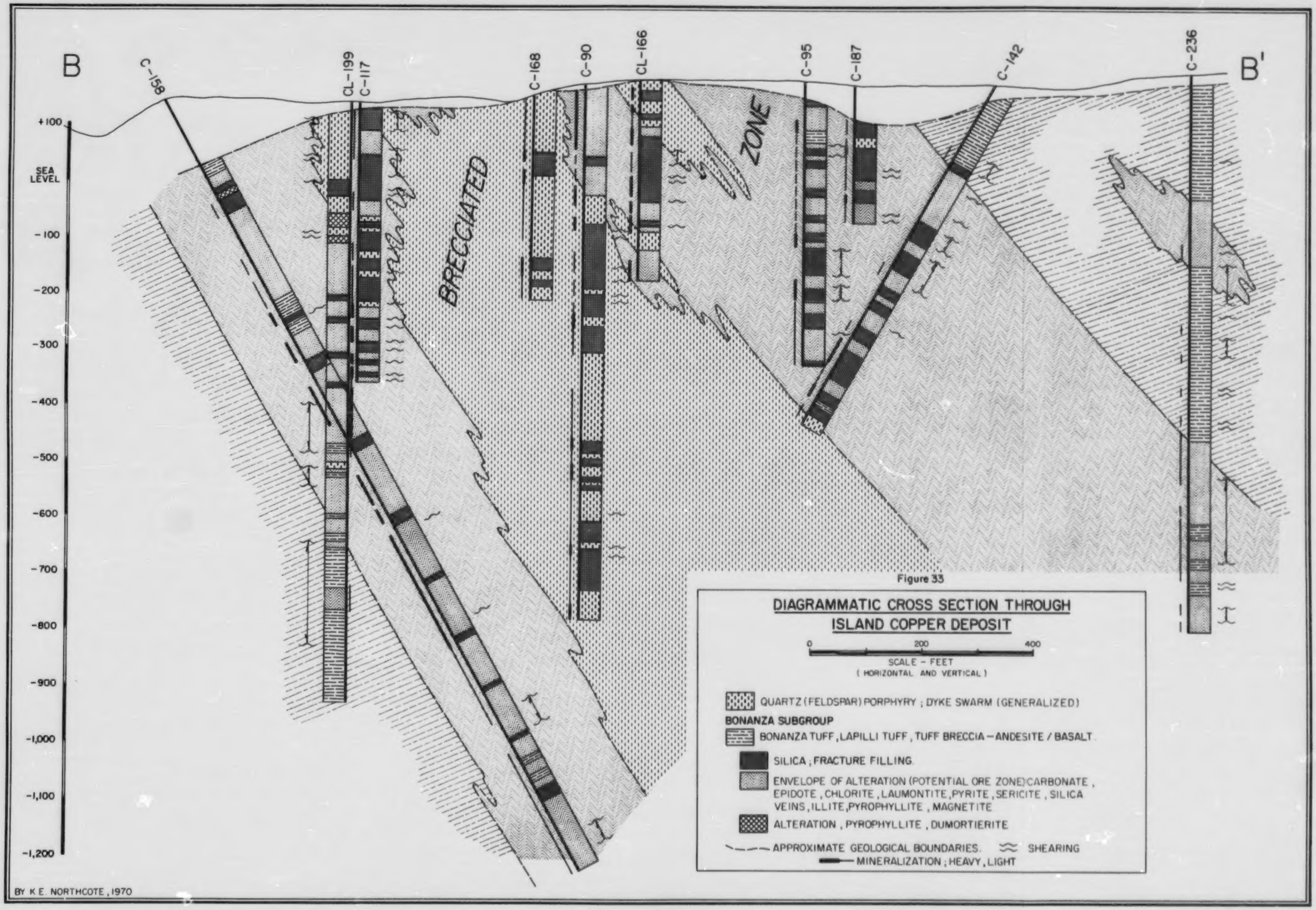
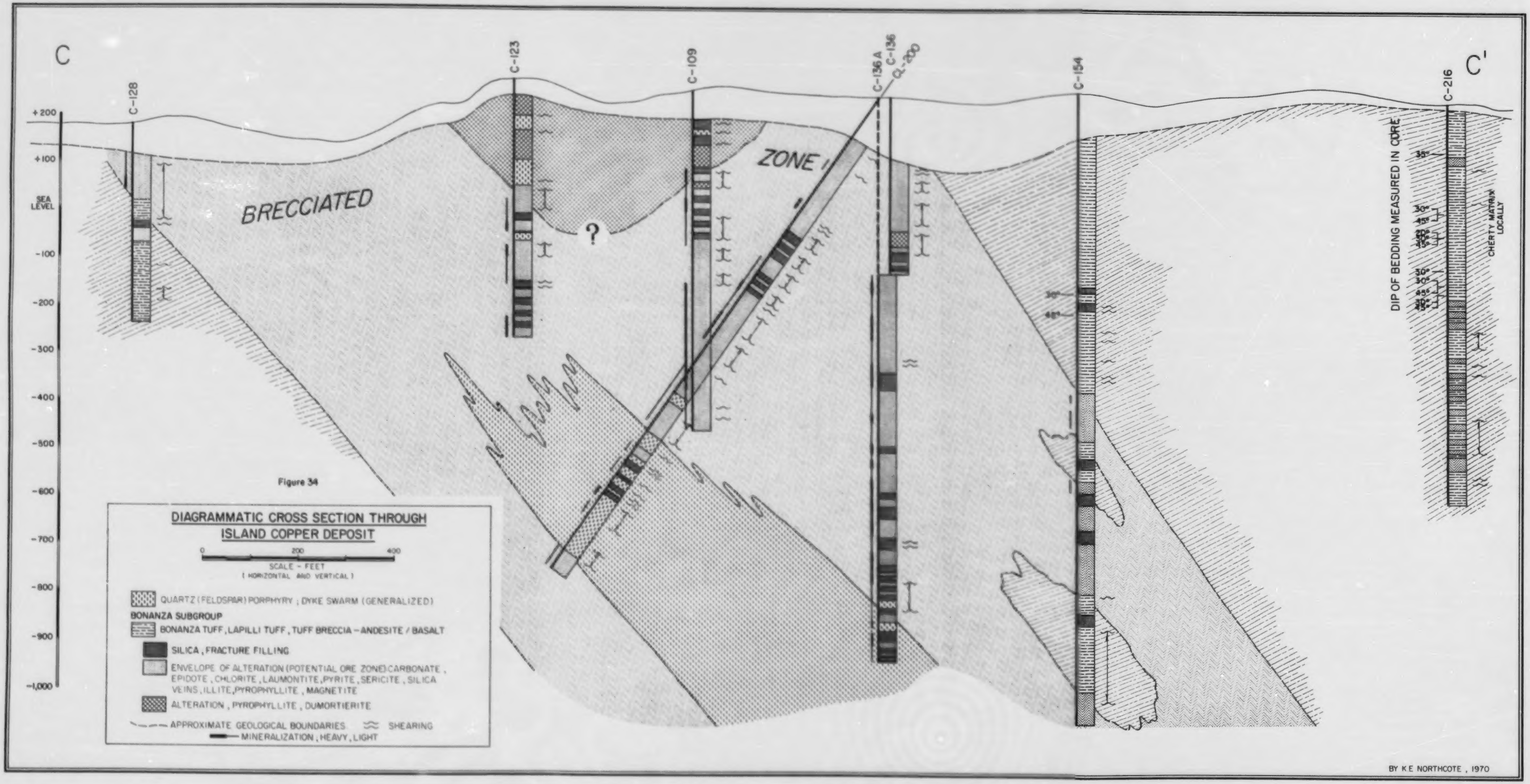

B
B'
C-158
CL-199
C-117
C-168
C-90
CL-166
C-95
C-187
C-142
C-236
BRECCIATED
ZONE
+100
SEA LEVEL
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1,000
-1,100
-1,200
0
200
400
SCALE - FEET
(HORIZONTAL AND VERTICAL)
QUARTZ (FELDSPAR) PORPHYRY ; DYKE SWARM (GENERALIZED)
BONANZA SUBGROUP
BONANZA TUFF, LAPILLI TUFF, TUFF BRECCIA – ANDESITE / BASALT.
SILICA ; FRACTURE FILLING.
ENVELOPE OF ALTERATION (POTENTIAL ORE ZONE):CARBONATE, EPIDOTE, CHLORITE, LAUMONTITE, PYRITE, SERICITE, SILICA VEINS, ILLITE, PYROPHYLLITE, MAGNETITE
ALTERATION, PYROPHYLLITE, DUMORTIERITE
APPROXIMATE GEOLOGICAL BOUNDARIES.
SHEARING
MINERALIZATION ; HEAVY, LIGHT
BY K E. NORTHCOTE, 1970

Figure 33

DIAGRAMMATIC CROSS SECTION THROUGH ISLAND COPPER DEPOSIT



C
C'
C-128
C-123
C-109
C-136 A
C-136
Q-200
C-154
C-216
+200
+100
SEA LEVEL
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1,000
BRECCIATED
ZONE I
?
30°
45°
DIP OF BEDDING MEASURED IN CORE
35°
30°
45°
20°
30°
15°
30°
30°
45°
30°
15°
CHERTY MATRIX LOCALLY
SCALE - FEET
0
200
400
(HORIZONTAL AND VERTICAL)
QUARTZ (FELDSPAR) PORPHYRY ; DYKE SWARM (GENERALIZED)
BONANZA SUBGROUP
BONANZA TUFF, LAPILLI TUFF, TUFF BRECCIA – ANDESITE / BASALT
SILICA, FRACTURE FILLING
ENVELOPE OF ALTERATION (POTENTIAL ORE ZONE) CARBONATE, EPIDOTE, CHLORITE, LAUMONTITE, PYRITE, SERICITE, SILICA VEINS, ILLITE, PYROPHYLLITE, MAGNETITE
ALTERATION, PYROPHYLLITE, DUMORTIERITE
APPROXIMATE GEOLOGICAL BOUNDARIES
SHEARING
MINERALIZATION, HEAVY, LIGHT
BY K E NORTHCOTE, 1970

Figure 34

DIAGRAMMATIC CROSS SECTION THROUGH ISLAND COPPER DEPOSIT

Assay Branch and also confirmed by Cargill at the University of British Columbia (*see* Cargill). Argillic alteration (illite) seems most abundant in fractures and shear zones where it is probably the result of weathering processes.

Mineralization

Copper mineralization occurs as very fine-grained disseminated chalcopyrite in siliceous veinlets and in brecciated, altered Bonanza rocks and quartz (feldspar) porphyry. Chalcopyrite is commonly associated with fine-grained magnetite. In addition, Young and Rugg report bornite (*see* Young and Rugg, 1971). Molybdenite occurs in siliceous zones as coatings in fractures. Hematite is common and pyrrhotite less common in the altered zone.

Suggested ore controls are:

(1) Early vertical to steep north dipping fracture or shear zone across bedding of Bonanza.

(2) Explosive brecciation accompanying emplacement and crystallization of quartz (feldspar) porphyry.

(3) Mineralization by differentiates of quartz (feldspar) porphyry.

WORK DONE:

During 1970, logging of the minesite and dump areas commenced, and by the year-end 345 acres had been cleared. Six bench openings and a dump platform were prepared and 7,400 lineal feet of road construction was completed in the mine area.

Adjacent to the plantsite a camp, capable of accommodating 480 men, was built. Access roads, a barge dock, and warehouse were constructed. Other work included the erection of the concentrator building and the maintenance building, plus preparation of the crushing plant and ore storage area. Preparation of the right-of-way for the 10-mile fresh-water pipe-line, from the Marble River, was close to completion at the end of the year. At the year-end 535 men were employed.

Some exploration was carried out on the Island Copper property during the year. Electromagnetic and induced polarization surveys were conducted covering 8.18 and 0.55 line-miles respectively. A geochemical soil survey was also carried out which consisted of 600 soil samples.

A 1,040-kva. diesel-driven electric generating unit was installed for construction-camp lighting and concentrator construction work.

A detailed study of the geology of the Island Copper deposit, with particular reference to alteration and structure, has been initiated by D. George Cargill at the Department of Geology, University of British Columbia.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 68; 1968, pp. 88, 324; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 204; Assessment Reports 710, 731, 738; Young, M. J., and Rugg, E. S., 1971, Geology and Mineralization of the Island Copper Deposit, *Western Miner*, Vol. 44, No. 2, p. 21; Cargill, D. G., Dissertation on Geology of Island Copper Deposit, in preparation, *UBC*.

EXPO, CAR, TAR (No. 12, Fig. G)

LOCATION: Lat. 50°37′ Long. 127°23′ (92L/11W, 12E)
At 300 feet elevation at east end of Rupert Inlet.

CLAIMS: Claims and fractions of the EXPO, CAR, TAR, KEN, KOL, BIM, SPAM, OPEX, LORRI, and BEE groups.

ACCESS: By gravel road from Port Hardy, 12 miles.

Owner: BALLINDERRY EXPLORATIONS LTD., 1108, 1111 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: The claims are underlain by andesite, basalt, and tuff of the Karmutsen Formation, limestone of the Quatsino Formation, and sedimentary and tuffaceous units of the lower Bonanza Subgroup. Disseminated pyrite and minor chalcopyrite and magnetite are reported.

Work done: Magnetometer survey, 35 line-miles; induced polarization survey, 24 line-miles; and geochemical soil survey, 35 line-miles on Expo claims; surface diamond drilling, five holes totalling 3,000 feet on Expo 34, 37, 39, and 40.

References: Assessment Reports 2658, 2659.

HAR, EXPO (No. 29, Fig. G)

Location: Lat. 50°34.5′ Long. 127°24′ (92L/11W)
South side of east end of Rupert Inlet.

Claims: HAR 1 to 13, 15, 17 to 44; EXPO 1 to 18.

Access: By road from Port Hardy, 13 miles.

Owner: Riviera Mines Limited.

Operator: PHELPS DODGE CORPORATION OF CANADA, LIMITED, 404, 1112 West Pender Street, Vancouver 1.

Work done: Induced polarization survey, 12.9 line-miles covering Har 5 to 9, 19 to 30, 33 to 36; surface diamond drilling, two holes totalling 920 feet on Har 7 and 21.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 205; Assessment Reports 1681, 2514, 2607.

PENNY (No. 77, Fig. G)

Location: Lat. 50°32′ Long. 127°19′ 92L/11W)
Fifteen miles southeast of Port Hardy, between branches of Waukwaas Creek, southeast of Rupert Inlet.

Claims: PENNY, totalling 16.

Access: By logging-roads from Port Hardy and Port McNeill.

Owner: COPPER GIANT MINING CORPORATION LTD., 1790, 777 Hornby Street, Vancouver 1.

Metal: Copper.

Description: The claims are underlain by rocks of Karmutsen Formation. Chalcopyrite occurs as very minor disseminations or as amygdaloidal fillings. Some bornite is reported.

Work done: Geological and magnetometer survey.

Reference: Assessment Report 2832.

KEOGH (No. 2, Fig. G)

Location: Lat. 50°32′ Long. 127°12′ (92L/11E)
At approximately 600 feet elevation, 9 miles southwest of Port McNeill and 1½ miles east of O'Connor Lake.

Claims: WALT 1 to 9; WALT 1 Fraction; LON 1 to 4, 7 to 12; KEO 3 to 8; SERP 1 to 9; TRIPLE T; KIUK 1, 2; COUGAR; MARGE L; REYNOLDS; LAST CHANCE.

Access: By road from Port McNeill, 9 miles.

Operator: COMINCO LTD., 800, 1155 West Georgia Street, Vancouver 5.

Metals: Copper, molybdenum.

Description: Quartz-filled shears in Karmutsen volcanics with minor disseminated pyrite, pyrrhotite, and chalcopyrite. Molybdenite-bearing float in same vicinity.

Work done: Magnetometer survey, 1 line-mile covering Last Chance, Marge L, Triple T, and Reynolds; geochemical soil survey, 31 samples covering Last Chance, Marge L, Triple T, and Reynolds; surface diamond drilling, two holes totalling 635 feet on Reynolds.

NOR (No. 64, Fig. G)

Location: Lat. 50°31′ Long. 127°07.5′ (92L/11E)
Four miles south-southwest of Port McNeill.

Claims: NOR 1 to 26.

Access: By logging-roads passing to the west and south of the claim group.

Owner: ENSBROOK MINES LTD., 24, 448 Seymour Street, Vancouver 2.

Description: Outcrops are confined mainly to the south part of the claims and consist of dark-green andesitic/basaltic flows of the Karmutsen Formation.

Work done: Magnetometer survey.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 208; Assessment Reports 2098, 2531.

BROOKS PENINSULA

LOIS (No. 21, Fig. G)

Location: Lat. 50°16′ Long. 127°37′ (92L/5E)
See report on this property, page 283.

KLASKINO INLET

JARR (No. 14, Fig. G)

Location: Lat. 50°19.5′ Long 127°42′ (92L/5E)
Between 1,000 and 3,000 feet elevation, 1 mile north of Klaskino Inlet.

Claims: JARR 11 to 32, 121, 122.

Access: By helicopter from Rumble Beach, 15 miles.

Owner: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

Metal: Copper.

Description: Chalcopyrite occurs in skarn within Bonanza Subgroup.

Work done: Geochemical stream sediment and soil survey, 200 samples on Jarr 11 to 32.

KLASKISH RIVER

TENT (No. 26, Fig. G)

Location: Lat. 50°19′ Long. 127°36′ (92L/5E)
At approximately 3,000 feet elevation, 8 miles southwest of Port Alice in the Klaskish River valley.

Claims: TENT 1 to 131.

Access: By helicopter from Port Alice, 8 miles.

Owner: VANCO EXPLORATIONS LIMITED, 900, 1111 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Quartz diorite intrusion into volcanics. Scattered extremely low-grade chalcopyrite and molybdenite in fractures and quartz veins and as disseminations.

Work done: Surface geological mapping, 1 inch equals 400 feet on Tent 1 to 28; magnetometer survey, 36 line-miles covering approximately half of the claims; induced polarization survey, 15 line-miles covering Tent 1 to 22; geochemical soil survey, 2,000 samples covering approximately half of the claims.

References: Assessment Reports 2459, 2739.

NEROUTSOS INLET

OFF (No. 15, Fig. G)

Location: Lat. 50°22′ Long. 127°37.5′ (92L/5E)
Between 300 and 1,500 feet elevation, 8 miles southwest of Port Alice, at headwaters of Kewquodie Creek.

Claims: OFF 1 to 30.

Access: By helicopter from Port Alice, 8 miles.

Owner: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

Metal: Copper.

Work done: Geochemical stream sediment and soil survey, 180 samples covering all claims.

KIM, FeCu, CuFe (No. 75, Fig. G)

Location: Lat. 50°27′ Long. 127°39.5′ (92L/5E)
Five miles south of Quatsino Sound, 6 miles west of Neroutsos Inlet, on Klootchlimmis River.

Claims: KIM 1 to 30, FeCu 1 to 6, CuFe 1 to 12.

Access: By boat from Coal Harbour and by logging-road or by helicopter from Port Hardy.

Owner: JOHN COTOWICK, 626 Howe Street, Vancouver 1.

Work done: Airborne magnetometer and airborne electromagnetic surveys were conducted.

Reference: Assessment Report 2731.

YREKA (No. 5, Fig. G)

Location: Lat. 50°27.4′ Long. 127°34′ (92L/5E)
Between 200 and 2,500 feet elevation, on the west side of Neroutsos Inlet, 4 miles northwest of Rumble Beach and Jeune Landing.

Claims: One hundred claims, including 16 Crown-grants.

Access: By water from Jeune Landing, 4 miles.

Owner: GREEN EAGLE MINES LTD., 333, 885 Dunsmuir Street, Vancouver 1.

Metals: Copper, silver, zinc.

Work done: Surface geological mapping; magnetometer and electromagnetic (helicopter) survey, 100 line-miles covering all claims; trenching.

References: *Minister of Mines, B.C.*, Ann. Repts., 1953, pp. 167–170; 1954, p. 164; 1955, pp. 76–78; 1964, pp. 154, 155; 1965, p. 228; 1966, pp. 65, 66; 1967, p. 70; *Geol. Surv., Canada*, Sum. Rept., 1929, Pt. A, pp. 124, 125.

SEL, SHIRLEY, KAREN (No. 79, Fig. G)

Location: Lat. 50°25′ Long. 127°27′ (92L/6W)
One mile north of Port Alice.

Claims: SEL, SHIRLEY, KAREN, totalling 146.

ACCESS: By road from Port Alice.

OWNER: DARKHAWK MINES LTD., 323, 409 Granville Street, Vancouver 2.

WORK DONE: Geochemical soil survey consisting of 762 samples.

REFERENCE: Assessment Report 2816.

BENSON RIVER

OLD SPORT MINE (No. 49, Fig. G)

By W. C. Robinson

LOCATION: Lat. 50°23′ Long. 127°14.5′ (92L/6E)
South end of Benson Lake, on the west side of Benson River.

ACCESS: By 26 miles of road from Port McNeill.

OWNER: COAST COPPER COMPANY LIMITED (controlled by Cominco Ltd.), Port McNeill.

METALS: Copper, iron (*see* Table 1 for production).

WORK DONE: Drifting and crosscutting, 3,983 feet; subdrifting, 2,592 feet; raising, 2,799 feet; diamond drilling, 30,502 feet. The 8 by 22-foot decline, being driven at minus 14 degrees, was advanced 531 feet during 1970. At the end of the year the face of the decline was 6,275 feet from the portal. A 200-kva. 6,900–550-volt transformer was added to the electrical equipment on the 4300 level. During August 1970, the production of iron concentrates ceased. The production of copper concentrates continued throughout 1970.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1911 to 1931; 1956, p. 117; 1960, p. 100; 1961, pp. 97–100; 1962, p. 97; 1963, p. 100; 1964, p. 153; 1965, p. 230; 1966, p. 66; 1967, p. 71; 1968, p. 98; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 207.

RAINY, BLUE OX, COSTA (No. 66, Fig. G)

LOCATION: Lat. 50°19.5′ Long. 127°13′ (92L/6E)
On Benson River southeast of Merry Widow Mountain, 1 mile south of Lac Truite, at Blue Ox and Rainier Creeks.

CLAIMS: RAINY, BLUE OX, COSTA, RAINIE EX, totalling 48.

ACCESS: By road, 20 miles south from Port McNeill, or by air 25 miles southeast from Port Hardy.

OWNER: ALICE LAKE MINES LIMITED, 327, 736 Granville Street, Vancouver 2.

WORK DONE: An aeromagnetic survey over the claim groups for a total of 30 line-miles.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 208; Assessment Reports 1760, 2306.

NIMPKISH LAKE

KINMAN (No. 25, Fig. G)

LOCATION: Lat. 50°21′ Long. 126°51′ (92L/7W)
East of Nimpkish Lake.

CLAIMS: KINMAN, HAZEL, YU, DRY, B, C, H, S, totalling 120.

ACCESS: By trail from the Canadian Forest Products Nimpkish camp, 4 miles.

OWNER: Juniper Mines Ltd.

OPERATORS: A. D. ROSS and K. ROSS, 1282 Chartwell Crescent, West Vancouver.

METALS: Copper, zinc, molybdenum.

Description: Replacement in limestone adjacent to granite intrusive. Disseminated copper and molybdenum in Coast Intrusions.

Work done: Extensive prospecting; induced polarization survey; geochemical soil and stream sediment survey, 500 samples; trenching, 216 cubic feet.

DIA (No. 17, Fig. G)

Location: Lat. 50°16′ Long. 126°55′ (92L/7W)
At approximately 450 feet elevation, 18 miles southeast from Beaver Cove and three-quarters of a mile east of Hustan Lake.

Claims: DIA 1 to 8.

Access: By truck from Beaver Cove, 18 miles.

Owner: NEWCONEX CANADIAN EXPLORATION LTD., 806, 525 Seymour Street, Vancouver 2.

Metals: Copper, zinc.

Description: Several small stringers of sphalerite with minor chalcopyrite occur in Quatsino limestone.

Work done: Geochemical soil survey, 100 samples covering two claims.

BONANZA LAKE

BOB (BONANZA MINE) (No. 60, Fig. G)

By W. C. Robinson

Location: Lat. 50°19′ Long. 126°45′ (92L/7E, 7W)
At elevations of 1,000 to 1,200 feet, 1½ miles south of Bonanza Lake.

Claims: BOB 1 to 13, 15 to 24, 26 to 30.

Access: By road from Beaver Cove.

Owner: R. A. McIver.

Operator: M.B.H. DEVELOPMENTS LTD., Box 4183, Station D, Vancouver.

Metal: Copper.

Work done: It has been reported that about 3,500 tons of ore was mined from the surface during 1970 and stockpiled. Three men were employed for 2½ months.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 100; Assessment Report 953.

BON (No. 28, Fig. G)

By G. E. P. Eastwood

Location: Lat. 50°15.6–16′ Long. 126°40.5–41.7′ (92L/7E)
At approximately 2,900 feet elevation 5 miles southeast of Bonanza Lake.

Claims: BON, totalling 80.

Access: From main Gold River-Beaver Cove road at south end of Bonanza Lake 6 miles south to end of westerly Crown Zellerbach road, thence about 1 mile east by rough foot-trail.

Owner: BRETTLAND MINES LTD., 909, 789 West Pender Street, Vancouver 1.

Metals: Iron, copper.

Description:

The Bon mineral occurrences are in predominantly volcanic rocks of the Karmutsen Group in the type area (Gunning, 1932) (*see* Fig. 35). These rocks are mostly light to dark green in colour, and consist of alternating layers of amygdaloidal and massive basalt or andesite. The amygdules are 1 to 10 millimetres in diameter, and consist of quartz, epidote, or both. Locally they also contain chalcopyrite. Pink feldspar phenocrysts occur in a few places, but porphyritic phases are uncommon,

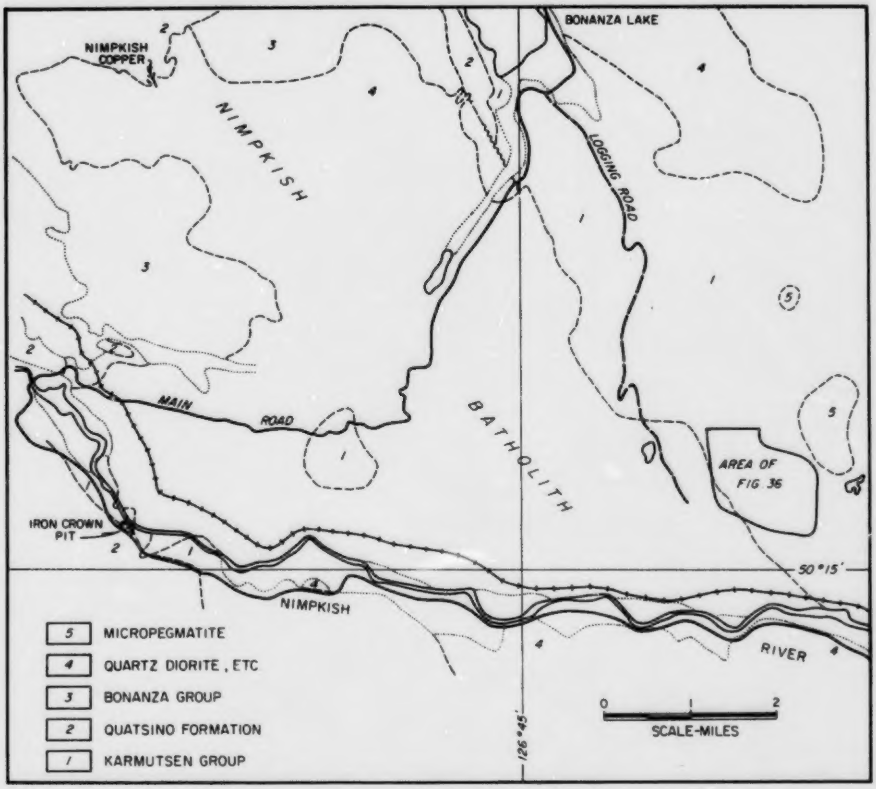

NIMPKISH COPPER
BONANZA LAKE
NIMPKISH
LOGGING ROAD
MAIN ROAD
BATHOLITH
AREA OF FIG. 36
IRON CROWN PIT
50°15'
NIMPKISH RIVER
126°45'
1
2
3
4
5
0 1 2
SCALE-MILES
5 MICROPEGMATITE
4 QUARTZ DIORITE, ETC
3 BONANZA GROUP
2 QUATSINO FORMATION
1 KARMUTSEN GROUP

Figure 35. Index map, Bonanza Lake area. Geology modified from Geological Survey of Canada maps 1028A and 1029A.

and visible feldspar is normally light yellowish green and commonly altered in part to epidote.

East of the Discovery trench (*see* Fig. 36) a band of silicified rock about 5 feet thick dips 30 degrees southwest and is traceable for about 350 feet. The weathered surface is mottled light and dark grey or brownish grey, suggesting replacement of limestone. The sawn surface, however, shows irregularly reticulating veins of quartz cutting silicified greenish-grey rock. In thin-section the greenish-grey rock is seen to consist of quartz, chlorite, epidote, and possibly a little pyroxene. A highly reflective black dust disseminated in the quartz around some holes may be graphite. Scattered hematite grains are pseudomorphous after pyrite. Quartz veinlets pass up from the silicified band into overlying epidosite. The epidote and pyroxene could have been formed during metasomatism of impure limestone or a volcanic rock, but the presence of chlorite would tend to suggest a volcanic rock. The band may be a silicified tuff.

A band of limestone is reported to occur in the volcanics along the creek north of the Discovery trench.

A short distance to the southwest of the showings the volcanic rocks are intruded by the Nimpkish Batholith, which is described by Gunning (in Hoadley, 1953, p. 30) as predominantly granodiorite. Around the head of the logging-road it is reddened and altered to epidote, but eastward to the contact it is fresh and

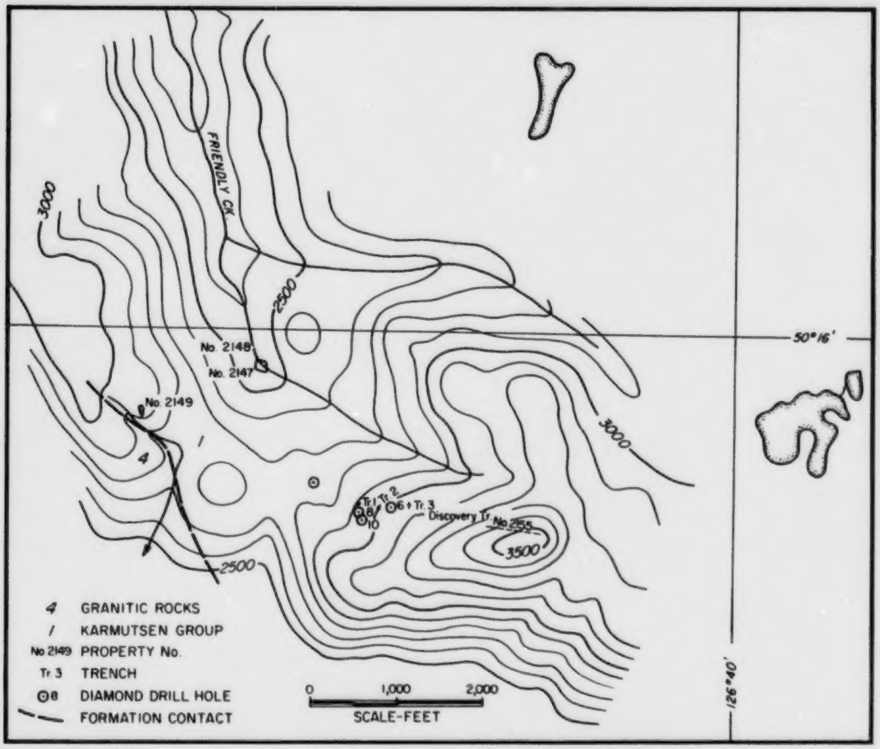

FRIENDLY CK.
3000
2500
No. 2148
No. 2147
No. 2149
4
/
3000
Tr. 1
Tr. 2
6 + Tr. 3
8
10
Discovery Tr.
No. 255
3500
2500
50°16'
126°40'
4 GRANITIC ROCKS
/ KARMUTSEN GROUP
No 2149 PROPERTY No.
Tr. 3 TRENCH
⊙8 DIAMOND DRILL HOLE
FORMATION CONTACT
0 1,000 2,000
SCALE-FEET

Figure 36. Bon showings.

increasingly fine grained, reflecting a broad, chilled, marginal zone. Hornblende needles are conspicuous in this zone. Near the showings the contact is followed by a small creek gully, and the rocks on either side show no contact effects. To the northwest, however, intrusive breccia is reported to occur along the contact. The contact near the showings may be a fault.

F. Holcapek, of Agilis Exploration Services Ltd., reports (personal communication) that the volcanic units dip southwest at low to moderate angles, flattening near the contact with the Nimpkish Batholith. He infers several strike and dip faults dislocating these units.

The principal showings on the property are replacements of parts of certain volcanic layers by skarn with either magnetite or pyrrhotite. They are strung out along a slightly curved line trending north 75 degrees west close to the divide between the drainages of the Bonanza and Nimpkish River systems (*see* Fig. 36). Where the dip can be determined, it is about 30 degrees southwest, and the deposits are roughly concordant with the enclosing volcanics. Since the apparent dip of the deposits to the west along the line is slightly steeper than the topographic slope in this direction, the deposits are apparently progressively lower stratigraphically from west to east. Repetition by dip faults is a possibility, but it is not suggested by the topography. Minor pyrite and chalcopyrite occur in some of these showings, and minor chalcopyrite was observed along a section of Friendly Creek. It is reported that some chalcopyrite occurs in the intrusive breccia along the contact of the Nimpkish Batholith; this occurrence was not visited. The individual showings are described below under their mineral inventory property numbers.

No. 2149—A large pod of reddish, platy magnetite lies on a shear zone dipping about 40 degrees southwest. Light-green volcanics in the footwall and down-dip in the hangingwall are not mineralized. The pod is about 25 feet wide down the dip of the shear zone and has a maximum thickness of 10 feet. It is exposed intermittently for about 60 feet, and it is reported that the corresponding magnetic anomaly has been traced for 250 feet. In colour and form the mineral resembles hematite, but it is strongly magnetic and has been confirmed as magnetite by X-ray diffraction. It is pocked with small limonite-bearing holes which probably represent oxidized pyrite crystals.

No. 2150—Diamond-drill hole No. 4 was drilled on the steep flank of a magnetic anomaly, and encountered both magnetite disseminated in andesite and a few sheared magnetite veinlets.

No. 2151—In trench No. 1 a volcanic stratum 3.5 feet thick has been replaced by skarn and magnetite, the magnetite being concentrated in the lower foot or so of the stratum. Pyrite veinlets cut the skarn, and pyrite pockets occur in mixed skarn and magnetite and in magnetite. The stratum dips 30 degrees southwest and is exposed for 25 feet. Diamond-drill hole No. 8, collared 60 feet south of the trench and 20 feet higher, cut 2 inches of garnet-epidote skarn, then 8 feet of magnetite containing disseminated pyrite and chalcopyrite; from the geometry this mineralization would appear to be a continuation of that in the trench. Diamond-drill hole No. 10, collared still farther south and 16 feet higher than No. 8, cut 3 inches of massive pyrite, then a foot of massive magnetite. A rough geometrical construction indicates that this mineralization is in a higher stratum, and that No. 10 was not drilled deep enough to intersect the mineralized stratum of the trench.

No. 2152—Trench No. 2 exposes for 50 feet a 6-foot stratum consisting mostly of pyrrhotite, with some magnetite and less pyrite. No chalcopyrite was seen, but it is reported that assays as high as 0.4 per cent copper were obtained.

No. 2153—Trench No. 3 has been cut in black material consisting of vertical and horizontal veins of magnetite in dark skarn. The veins are 2 to 3 inches thick, and the vertical ones strike northwest. Diamond-drill hole No. 6, 15 feet to the southwest and about 50 feet from trench No. 2, cut neither magnetite nor pyrrhotite, but at the bottom encountered epidote alteration containing minor copper mineralization.

No. 2154—The Discovery trench exposes an apparently stratiform band of massive magnetite for about 30 feet. The apparent dip down this westerly trace is 5.5 degrees. The footwall is formed by little altered volcanics and the hangingwall, 6 feet above, is the erosion surface. The only impurity in the magnetite is a little limonite along fractures.

No. 2155—Magnetite is associated with the silicified band described above, and sporadic exposures of magnetite continue 150 feet beyond the most easterly exposure of silicified rock, indicating a possible magnetite band 500 feet long. At the most westerly exposure of silicified rock the hangingwall is covered and the footwall consists of skarn containing minor magnetite. A few feet to the east, 5 feet of massive magnetite is exposed for a length of 10 feet between little altered volcanic rock below and the silicified rock above. Fifty feet farther east the silicified stratum overlies fresh greenish-grey andesite, but it is laced with epidote and magnetite and passes up into massive epidosite. The epidote in the silicified rock contains disseminated pyrite and galena. A few small, scattered exposures over the next 280 feet show magnetite along the hangingwall of the silicified stratum. A trench near the northeast corner of the 3,500-foot contour exposes 12 feet of massive magnetite with a few feet of skarn to the northeast; the contact appears to be nearly vertical. The southwest contact of the magnetite was not exposed.

No. 2147—Friendly Creek flows through an area that analysis of fracture patterns taken from aerial photographs indicates as an area of intense tensional fracturing. The volcanic rocks exposed along the creek in this area appear to be more fractured and sheared than elsewhere, and contain narrow quartz veins along some of the fractures. Some of the veins contain pyrite and chalcopyrite. A sample was taken, from an area measuring about 10 by 15 feet, consisting of chips containing vein quartz. The copper content determined by atomic absorption spectrophotometry was 51 p.p.m.

No. 2148—A few hundred feet down Friendly Creek from the above sampled area, but probably still within the area of tensional fracturing, a 4-foot section of an amygdaloidal flow contains chalcopyrite in the amygdules. The remainder of the flow, above and below this section, is apparently barren. Within the 4-foot section the chalcopyrite forms small pockets, 1 to 2 millimetres across, in some of the larger amygdules and constitutes most or all of some of the smaller ones. It occurs mostly near the outer surface, but in one or two amygdules it appears to follow fractures in the quartz. The mineralized section was not sampled but is visually estimated to contain 0.2 to 0.3 per cent copper. It is exposed for about 100 feet.

WORK DONE: Detailed geological and ground magnetometer surveys on Bon 19 to 22; tectonic analysis of aerial photographs; soil geochemistry on Bon 25 to 28; 550 feet of diamond drilling in five holes on Bon 25 to 28.

REFERENCES: Gunning, H. C., *Geol. Surv., Canada,* Sum. Rept., 1931, Pt. A, pp. 22–35; Hoadley, J. W., *Geol. Surv., Canada,* Mem. 272; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 209; Assessment Report 1821.

KELSEY BAY

CV, PLUS (No. 67, Fig. G)

LOCATION: Lat. 50°22.5′ Long. 126°10′ (92L/8E)
Claims are located on the southwest side of Adam River north of Rooney Lake, 12 miles west of Kelsey Bay.

CLAIMS: CV, PLUS, totalling 100.

ACCESS: By 16 miles of logging-road west from Kelsey Bay.

OWNER: ARMEDA COPPER MINES LTD., 407, 475 Howe Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: The property is underlain by Karmutsen fine-grained massive and amygdaloidal basalt. A little chalcopyrite is reported in road cuts on claims CV 59 and Plus 40.

WORK DONE: Magnetometer and geochemical soil surveys.

REFERENCE: Assessment Report 2379.

BOYES (No. 10, Fig. G)

LOCATION: Lat. 50°17.5′ Long. 126°03′ (92L/8E)
At 1,000 to 3,500 feet elevation, on the west side of Adam River, approximately 10 miles west of Sayward and 2 miles southwest of Keta Lake.

CLAIMS: BOYES 1 to 4, M 1 to 37, DENNIS 1 to 39, BRUCE 1 to 24, GEO 1 to 6, KEVIN 1 to 30, TAMMY 1 to 10.

ACCESS: By gravel road from Kelsey Bay, 12 miles.

OWNER: Western Standard Silver Mines Ltd.

OPERATOR: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

Metals: Copper, silver.

Description: The claim group is underlain by limestone and volcanic rocks which are intruded by granodiorite and related intrusives. Principal mineralization occurs in a shear zone which extends for several hundred feet and is 3 to 4 feet wide.

Work done: Surface geological mapping, 1 inch equals 1,320 feet; geochemical soil and stream sediment survey, 160 and 70 samples respectively; surface diamond drilling, two holes totalling 540 feet on M 28 and 30.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 210.

CAM, DOC (No. 20, Fig. G)

Location: Lat. 50°14′ Long. 126°02′ (92L/1E, 8E)
At about 2,500 feet elevation, approximately 10 miles west of Sayward on Adam River, 6 miles south of Keta Lake.

Claims: CAM 3 to 10, 15 to 24, 30 to 41; DOC 1 to 10.

Access: By road from Sayward, approximately 12 miles.

Owner: Adam River Mining Ltd.

Operator: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Copper.

Description: Mineralization consists of scattered showings of copper sulphides disseminated in andesite tuff and amygdaloidal andesite.

Work done: Claims and topography mapped; surface geological mapping, 1 inch equals 100 feet on Cam 3 to 6, 19 to 24; magnetometer survey, 23.4 line-miles covering Cam 3 to 10, 15 to 24, 30 to 41; geochemical survey, 2,480 samples covering Cam 3 to 10, 15 to 24, 30 to 41; surface diamond drilling, four holes totalling 800 feet.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 210.

WR (No. 16, Fig. G)

Location: Lat. 50°09.5′ Long. 125°59.5′ (92K/4W)
At approximately 550 feet elevation, on White River, 11 miles above its confluence with Salmon River.

Claims: WR 1 to 14, 1 Fraction.

Access: By truck from Sayward, 14 miles.

Owner: NEWCONEX CANADIAN EXPLORATION LTD., 806, 525 Seymour Street, Vancouver 2.

Metals: Copper, iron.

Description: Chalcopyrite, bornite, and pyrite are disseminated in a fracture zone in amygdaloidal basalt.

Work done: Geochemical survey, 400 soil and silt samples and 18 chip samples covering WR 1 to 12 and 1 Fraction; trenching, 6,388 cubic feet on WR 1 to 3.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 210; Assessment Report 2498.

ELLEN, LEM, DOT (No. 58, Fig. G)

Location: Lat. 50°15′ Long. 125°51′ (92K/4W, 5W)
At approximately 1,800 feet elevation, on the west side of the Salmon River, 9 miles southeast of Sayward.

Claims: ELLEN 1 to 40, LEM 1 to 20, DOT 1 to 30.

Access: From Sayward by four-wheel-drive vehicle, 10 miles.

Owner: JETEX RESOURCES LTD., 430, 1155 West Georgia Street, Vancouver 5.

Metals: Copper, molybdenum.

Description: The area is underlain by basalt and andesite flows, breccia, and tuff of the Karmutsen Formation. Disseminated chalcopyrite and bornite occur in amygdaloidal basalt.

Work done: Topography mapped; surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 5 line-miles; geochemical soil survey, 131 samples; surface diamond drilling, six holes totalling 600 feet on the Ellen claims.

QUADRA ISLAND

COPPER ROAD, LUCKY JIM (No. 34, Fig. G)

Location: Lat. 50°13′ Long. 125°17′ (92K/3W) At approximately 500 feet elevation, on the northwest side of Quadra Island.

Claims: COPPER ROAD, LUCKY JIM, SUNRISE, SAXON, VIN, RIB, OCT, CHEEBLLAH, APE, and others totalling approximately 250.

Access: By ferry from Campbell River to Quathiaski Cove, thence 15 miles by road.

Operator: WESTERN MINES LIMITED, Box 8000, Campbell River.

Metals: Copper, gold.

Description: Disseminated chalcocite, chalcopyrite, and pyrite occur in andesite. Chalcopyrite-bornite-quartz veins occur in sheared volcanic rocks.

Work done: Surface geological mapping, 1 inch equals 200 feet on Cheebllah 1 to 6 and 1 inch equals 400 feet on Oct 49 to 58; magnetometer survey, 5 line-miles covering Copper Road and Lucky Jim; geochemical soil survey, approximately 3,000 samples covering Cheebllah, Copper Road, and Oct; surface diamond drilling, five holes totalling 2,500 feet on Copper Road; percussion drilling, nine holes totalling 1,500 feet on Cheebllah 1 to 7.

References: *Minister of Mines, B.C.*, Ann. Repts., 1962, p. 95; 1968, p. 100; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 211.

COPPER HILL, COLLEEN (No. 4, Fig. G)

Location: Lat. 50°07.2′ Long. 125°16.5′ (92K/3W) Between 500 and 800 feet elevation, on Quadra Island, 1½ miles northwest of Heriot Bay.

Claims: COPPER HILL 1, 2; COLLEEN 1, 2; EVELYN 1 to 3; BEAVER DAM 1, 2; BIT 1, 2; COPPER CLIFF; CLIFF 1, 2; ALPHA to MU, totalling 26.

Access: By ferry and road from Campbell River, 12 miles.

Owner: QUADRA MINING CO. LTD., 1161 South Murphy Street, Campbell River.

Metal: Copper.

Work done: Self-potential survey, one-half line-mile covering Bit; road construction, one-half mile on Bit and Evelyn; surface diamond drilling, one hole totalling 30 feet on Evelyn; percussion drilling, 75 holes totalling 500 feet on Bit and Evelyn.

References: *Minister of Mines, B.C.*, Ann. Repts., 1953, pp. 163–165; 1964, p. 152; 1968, p. 100; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 212.

CONTACT, COPPER VALLEY (No. 81, Fig. G)

Location: Lat. 50°09′ Long. 125°15′ (92K/3E, 3W)
Copper Valley-David group is 2½ miles northwest of Hyacinthe Bay; other claims extend northwest from Open Bay.

Claims: CONTACT 1 to 10; WFP 1 to 28; SNOOPY 1 to 4; QUAD 1 to 22; COPPER VALLEY 1 to 10; DAVID 1, 2.

Access: By road from Heriot Bay, Quadra Island, 4 to 6 miles.

Owner: PRINCE STEWART MINES LTD., 170 Sixth Avenue, Campbell River.

Metals: Gold, silver, copper.

Description: (1) Flow top deposits of chalcocite, (2) quartz veins, and (3) pyritized zone containing geochemical anomalies. The rocks are Karmutsen volcanics and Open Bay limestone in contact with Coast Intrusives.

Work done: Claims mapped in part; surface workings mapped; surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 15 line-miles; and geochemical soil survey, 800 samples covering Contact 1 to 10 and WFP 7 to 12; road construction, 2 miles on Contact and Copper Valley claims; widespread trenching; stripping, 200 by 150 feet on Contact 4; surface diamond drilling, two holes totalling 120 feet on Copper Valley.

TANNER (No. 36, Fig. G)

Location: Lat. 50°04.5′ Long. 125°14.5′ 92K/3E)
Steep Island, Gowlland Island, and Quadra Island at Gowlland Harbour.

Claims: TANNER 2 to 12.

Access: From Campbell River by boat, 3 miles.

Owner: SUMMIT EXPLORATIONS & HOLDINGS LIMITED, Tenth Floor, 366 Bay Street, Toronto 1, Ont.

Metal: Copper.

Description: Bedded volcanic flows of Karmutsen Formation contain disseminated, small, irregular-shaped blebs of chalcocite.

Work done: Self potential and geochemical soil surveys.

COURTENAY

MT. WASHINGTON COPPER (No. 53, Fig. G)

Location: Lat. 49°46′ Long. 125°18′ (92F/14E, 14W, 11E, 11W)
Between 1,300 and 4,500 feet elevation, in the vicinity of Mount Washington, northwest of Courtenay.

Claims: An area of 7,940 acres enclosing 178 located and four Crown-granted (DOMINEER) claims. The property is subject to lease agreement with Canadian Pacific Oil and Gas Limited.

Access: From Courtenay by road, 15 miles.

Owner: MT. WASHINGTON COPPER CO. LTD., 610, 890 West Pender Street, Vancouver 1.

Metals: Copper, molybdenum, silver, gold.

Work done: Electromagnetic, induced polarization, magnetometer, and geochemical silt surveys; trenching, 400 feet on Gem 3 and 6 and GMB 9 claims.

References: *Minister of Mines, B.C.*, Ann. Repts., 1964, p. 155; 1966, p. 71; 1968, p. 101; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 212, 213; Assessment Reports 1145, 1691.

BRENT, JOHN, CATHY (No. 61, Fig. G)

Location: Lat. 49°40′ Long. 125°18′ (92F/11W) Upper Cruickshank River, 12 miles west of Courtenay, at approximate elevation of 2,700 feet.

Claims: BRENT 1 to 24, JOHN, CATHY, DECIE, ROSALIE, HEATHER, ALLISON, DAVID, ANGIE, LISA.

Access: From Courtenay by road, 27 miles.

Owner: MOUNT SICKER MINES LTD., Box 576, Victoria.

Metals: Copper, silver.

Description: Chalcopyrite and minor bornite in chloritized, sheared, and fractured basaltic lavas and pyroclastics of Karmutsen Formation; local occurrences of disseminated chalcopyrite in altered volcanics adjacent to granodiorite body.

Work done: Topography and surface workings mapped; surface geological mapping, 1 inch equals 100 feet on Angie and Heather and 1 inch equals 400 feet on Brent 1 to 10, 21, and 22 claims; geochemical soil survey, 450 samples.

Reference: Assessment Report 2762.

TEXADA ISLAND

MARBLE BAY, LITTLE BILLY (No. 57, Fig. G)

Location: Lat. 49°46′ Long. 124°34′ (92F/10E, 15E) Vicinity of Vananda, at Sturt Bay, Texada Island.

Claims: Seventy-seven claims of which 23 are Crown-grants and two mineral leases, M-1 and M-15.

Access: From Vananda by road, 0 to 4 miles.

Owner: IDEAL BASIC INDUSTRIES, INC., 821—17th Street, Denver, Colo. 80202.

Work done: Surface diamond drilling, two holes totalling 71 feet on Mineral Lease M-1, percussion drilling, seven holes totalling 580 feet.

TEXADA MINE (No. 48, Fig. G)

By W. C. Robinson

Location: Lat. 49°43′ Long. 124°34′ (92F/10E) The mine is at Welcome Bay on the southwest coast of Texada Island.

Access: Eight miles by road from Vananda.

Owner: TEXADA MINES LTD., Box 10, Gillies Bay.

Metals: Iron, copper (*see* Table 1 for production).

Work done: Drifting and crosscutting, 7,310 feet; raising, 1,180 feet; diamond drilling, 24,074 feet. During 1970, the Lake room and pillar mine was connected to the shaft section of the mine and about 400 feet of drifting was done on the Anomaly A ore zone. Additional regrind facilities were installed in the mill. New construction included the erection of a 20 by 40-foot extension to the machine-shop. A ball mill driven by a 400-horsepower motor was installed in the mill and 1,600 feet of overhead power-line was built to Cranby Lake.

References: *Minister of Mines, B.C.*, Ann. Repts., 1964, pp. 146–151; 1966, p. 72; 1967, p. 72; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 213.

VERN (No. 1, Fig. G)

Location: Lat. 49°42′ Long. 124°25.5′ (92F/9W)
At approximately 1,000 feet elevation on the south side of Mount Pocahontas, on Texada Island.

Claims: VERN 1 to 32, WIN 1.

Access: By car from Vananda, 7 miles.

Owner: KITIMAT COPPER CO. LTD., 200, 1200 West Pender Street, Vancouver 1.

Metals: Copper, silver.

Description: Chalcopyrite and magnetite occur in volcanic rocks at a contact zone.

Work done: Trenching, 250 feet with D-7 and percussion drilling, 20 holes totalling 150 feet on Vern 1 and 2; 3,000 feet of road constructed from existing road up south side of Mount Pocahontas.

References: *Minister of Mines, B.C.*, Ann. Rept., 1922, p. 238; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 214.

TEX, BOB (No. 30, Fig. G)

Location: Lat. 49°38′ Long. 124°18′ (92F/9W)
At approximately 1,500 feet elevation, on the east side of Texada Island, about 2 miles north of Mount Grant.

Claims: TEX 1 to 34, BOB 1 to 40.

Access: By four-wheel-drive vehicle from Vananda, 20 miles.

Operator: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Closely spaced fracture cleavage with coatings of pyrite, chalcopyrite, and molybdenite in shear zone cutting contact between granodiorite and basic volcanic flows and fragmental rocks.

Work done: Surface geological mapping, 1 inch equals 200 feet on 12 claims; induced polarization survey, 11 line-miles covering four claims; geochemical soil survey, 800 samples covering 20 claims; trenching, 100 feet on Tex 4; surface diamond drilling, six holes totalling 1,550 feet on Tex 1 to 4.

ALBERNI MINING DIVISION

BROOKS PENINSULA

LOIS (No. 21, Fig. G)

Location: Lat. 50°16′ Long. 127°37′ (92L/5E)
At approximately 2,000 feet elevation, 11 miles south 40 degrees west of Port Alice, at height of land 5 miles east of Klaskish Inlet.

Claims: LOIS 1 to 36.

Access: By helicopter from Port Alice, 11 miles.

Owner: VANCO EXPLORATIONS LIMITED, 900, 1111 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum, cobalt.

Description: Quartz diorite plug intrudes a thick sequence of basic volcanics. Sparse erratic disseminations of chalcopyrite and very minor molybdenite are widely scattered over north half of quartz diorite body.

Work done: Surface geological mapping, 1 inch equals 400 feet on Lois 1 to 36; induced polarization survey, 10 line-miles covering Lots 10 to 16, 28, 30, 32, 34; magnetometer survey, 36 line-miles covering Lois 1 to 36; geochemical soil and rock surveys, 1,600 and 130 samples respectively covering all claims.

Reference: Assessment Report 2384.

FAIR HARBOUR

MARK, LAURA LEE (No. 35, Fig. G)

Location: Lat. 50°04′ Long. 127°05′ (92L/3E)
Fair Harbour, at approximately 300 feet elevation.

Claims: Eleven MARK, nine LAURA LEE.

Access: By road from Fair Harbour, 1 mile.

Operator: PECHINEY DEVELOPMENT LIMITED, 701, 744 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Disseminated mineralization in volcanic rocks in the vicinity of a granodiorite intrusion.

Work done: Surface geological mapping; geochemical survey; surface diamond drilling, three holes totalling 1,000 feet.

TAHSIS

GEO (No. 8, Fig. G)

Location: Lat. 49°55′ Long. 126°40′ (92E/15E)
At approximately 1,500 feet elevation, 1 mile west of Tahsis, at the head of Tahsis Inlet.

Claims: GEO 1 to 10.

Access: By road from Tahsis, 1½ miles.

Owner: SEMIAHMOO PETRO-MINES LTD., 882 Maple Street, White Rock.

Metals: Copper, iron.

Description: Mineralization occurs in garnet-epidote skarn within limestone partly surrounded by granodiorite(?). Mineralization is said to consist of chalcopyrite, pyrite, magnetite, pyrrhotite, bornite, and azurite.

Work done: Surface geological mapping covering two claims.

References: *Minister of Mines, B.C.*, Ann. Repts., 1922, p. 231; 1923, p. 247; 1924, p. 224; 1925, p. 269; 1926, p. 300; 1928, p. 373; 1931, p. 168; 1933, p. 252; 1955, p. 78; 1956, p. 119; 1962, p. 104.

BUTTLE LAKE

LYNX MINE (No. 32, Fig. G)

By W. C. Robinson

Location: Lat. 49°34.5′ Long. 125°35.5′ (92F/12E)
The mine is on Myra Creek, 1 mile west of the south end of Buttle Lake.

Access: By 55 miles of road from Campbell River.

Owner: WESTERN MINES LIMITED, 870, One Bentall Centre, Vancouver 1; mine office, Myra Creek.

Metals: Copper, zinc, lead, silver, gold (*see* Table 1 for production).

Work done: Drifting and crosscutting, 6,642 feet; raising, 2,025 feet; diamond drilling, 41,585 feet. A new No. 6 level was started, using trackless mining methods. During 1970, a lead circuit in the concentrator was placed in operation and a pilot plant was erected to test the feasibility of filtering all tailings, with a view to stacking on surface. A 4,160-volt overhead line was run from the No. 10 level portal to the No. 6 level to supply power to a 300-kva. three-phase 4,160–600-volt transformer. Other construction included the paving of 24.8 miles of the mine access road lying within Strathcona Park.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1964, pp. 157–166; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 218.

PRICE (No. 32, Fig. G)

LOCATION: Lat. 49°33.5′ Long. 125°34.2′ (92F/12E)
At approximately 1,300 feet elevation, one-half mile west of the south end of Buttle Lake.

CLAIMS: Fifty-five claims, four of which are Crown-granted and the remainder held by record.

ACCESS: By road from Campbell River, 55 miles.

OWNER: WESTERN MINES LIMITED, 870, One Bentall Centre, Vancouver 1.

DESCRIPTION: Altered, acidic, Permian volcanics with irregular lens-shaped orebodies, often close to unaltered andesitic flows.

WORK DONE: Surface diamond drilling, six holes totalling 2,235 feet on W 10, 12, 69, and 100.

PARAMOUNT (MYRA FALLS MINE) (No. 32, Fig. G)

By W. C. Robinson

LOCATION: Lat. 49°34.3′ Long. 125°35.3′ (92F/12E)
On the south side of Myra Creek, 1 mile west of the south end of Buttle Lake.

CLAIMS: Sixty-nine recorded and Crown-granted claims.

ACCESS: By road from Campbell River, 55 miles.

OWNER: WESTERN MINES LIMITED, 870, One Bentall Centre, Vancouver 1.

METALS: Zinc, copper, silver, lead, gold.

DESCRIPTION: Altered, acidic, Permian volcanics with irregular lens-shaped orebodies, often close to unaltered andesitic flows.

WORK DONE:

Underground workings mapped; surface geological mapping, 1 inch equals 1,000 feet on Lots 1344, 1345, and 1670; underground geological mapping on Lot 1671; ground magnetometer survey, 12,000 feet on Lots 1667 to 1670; drifting and crosscutting, 1,205 feet; raising, 500 feet; diamond drilling, 14,448 feet.

During 1970, work started on the driving of a decline at minus 14.8 degrees to establish 11, 12, and 13 levels. At the end of the year the decline had advanced a distance of 1,437 feet from the portal. A road was constructed from the Myra Creek bridge to the decline portal and a 4,160-volt overhead power line was erected from the Lynx mine to the Myra Falls mine No. 11 level portal. Two 25-horsepower fans were installed at the No. 11 level portal and two 10-horsepower fans were installed at the No. 10 level portal. Three 25-horsepower pumps were installed underground. On the surface two 150-horsepower air compressors, one 5-horsepower M.G. set, and two 100-kw. Cummings diesel electric sets for emergency standby were installed. Other new construction during 1970 included the erection of a 40 by 90-foot building near the decline portal to house diesel electric standby units, compressors, and shop facilities.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 218, 219.

CREAM, BEAR (No. 11, Fig. G)

LOCATION: Lat. 49°30′ Long. 125°33′ (92F/5E, 12E)
Between 3,000 and 5,000 feet elevation, 4 miles south of Buttle Lake and west of Cream Lake.

CLAIMS: CREAM 1 to 18; CREAM 1E to 6E; BEAR 1 to 42; ELK 1 to 9; X 1 to 25; PRICE 1 to 4; F 1 to 28; D 1 to 18; STAN 1 to 22; H 1 to 6; CROSS 1, 2.

ACCESS: By road from Campbell River, 55 miles.

OWNER: CREAM SILVER MINES LTD., c/o 4125 Sardis Street, Burnaby 1.

METALS: Copper, lead, zinc, gold, silver.

DESCRIPTION: Galena, pyrite, sphalerite, tetrahedrite, pyrargyrite, owyheeite, and arsenopyrite occur in northwesterly trending quartz carbonate fissure veins within the Sicker Group.

WORK DONE: Geochemical soil survey, 363 samples on X 1 to 17, 20 to 23, D 1 to 3, F 1 to 4, 7 to 10, 13, 14, 18, and 20 claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 219; Assessment Reports 2254, 2647.

HERBERT INLET

BIG BOY (No. 37, Fig. G)

LOCATION: Lat. 50°25.5′ Long. 125°54′ (92F/5W)
At approximately 450 feet elevation, at the head of Herbert Inlet and on the east side of the Moyeha River.

CLAIMS: BIG BOY.

ACCESS: By boat from Tofino, 20 miles.

OWNER: CONCORDE EXPLORATIONS LTD., 24, 448 Seymour Street, Vancouver 2.

METALS: Gold, silver.

DESCRIPTION: Quartz veins and veinlets containing chalcopyrite, sphalerite, galena, pyrite, and some visible gold.

WORK DONE: Surface and underground geological mapping; trenching, 80 by 4 by 5 feet; two old winzes pumped out and loose rock removed.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1933, p. 251; 1935, p. F43; 1940, p. 27; 1941, p. 27.

PW, RW, JB (No. 52, Fig. G)

LOCATION: Lat. 49°16–18.5′ Long. 125°56′ to 126°02′ (92F/5W, 92E/8E)
On Catface Range peninsula, south of Herbert Inlet.

CLAIMS: PW, RW, JB, W, RH, totalling 81.

ACCESS: Twelve miles northwest by boat from Tofino.

OWNER: FORT RELIANCE MINERALS LIMITED, 915, 25 Adelaide Street East, Toronto, Ont.

METALS: Copper, molybdenum.

WORK DONE: Geochemical and magnetometer surveys covering PW group.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 216; Assessment Reports 2116, 2454.

CATFACE (No. 24, Fig. G)

LOCATION: Lat. 49°16′ Long. 125°59′ (92F/4W, 5W; 92E/1E, 8E)
From 1,200 to 2,900 feet elevation, in the Catface Range, approximately 10 miles north of Tofino, between Bedwell Sound and Herbert Inlet.

CLAIMS: CATFACE, totalling 143 claims and 23 fractions.

ACCESS: Ten miles by boat and then 4½ miles by logging-road from Tofino.

OWNER: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum, silver, gold.

DESCRIPTION: Catface is a chalcopyrite, bornite, molybdenite porphyry copper deposit with considerable copper carbonates and oxides. Mineralization replaces mafic minerals and occurs in silica-filled fractures in quartz diorite, quartz monzonite, and basic volcanic rocks. The main alteration is silicic. Regional faults, fracturing, and cross-fracturing are important ore controls.

WORK DONE: Claims, workings, and topography mapped; underground geological mapping, 1 inch equals 20 feet on Catface 1, 3, 18; induced polarization survey, approximately 20 line-miles; underground work, a 7 by 8-foot adit was driven for 2,800 feet and six diamond-drill stations were established. A 10,000-ton stockpile was made from the material removed from the adit so that it may be used for further testing. Engineering studies were begun concerning rock stabilities and a programme to computerize drill-hole data was instituted.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1962, p. 105; 1963, p. 102; 1967, p. 74; 1968, p. 102; Assessment Reports 540, 541.

KENNEDY RIVER

TES (No. 74, Fig. G)

LOCATION: Lat. 49°18′ Long. 125°20′ 92F/6W)
South of Taylor River, 6 miles west of the west end of Sproat Lake.

CLAIMS: TES 2, 3, 7 to 20.

ACCESS: Alberni–Tofino highway for 27 miles, thence by logging-road for 2 miles.

OWNER: W. GUPPY, Box 94, Tofino.

METAL: Copper.

WORK DONE: Geological, geochemical, and geophysical surveys were conducted.

REFERENCE: Assessment Report 2699.

OK (No. 43, Fig. G)

LOCATION: Lat. 49°15′ Long. 125°22′ (92F/3W, 6W)
Between 500 and 1,000 feet elevation, on the Tofino highway, 35 miles west of Port Alberni on Kennedy River.

CLAIMS: OK, totalling 20.

ACCESS: From Port Alberni by highway, 35 miles.

OWNER: ALBERNI MINES LIMITED, 319 Argyle Street, Port Alberni.

METALS: Copper, molybdenum.

DESCRIPTION: Granodiorite is in contact with Karmutsen volcanics. Numerous diorite and porphyry dykes. Quartz, calcite, and epidote veins contain pyrite (chalcopyrite) and some molybdenite.

WORK DONE: Magnetometer survey, 6 line-miles covering part of the group; surface diamond drilling, two holes totalling 810 feet on OK 2 and 14.

VENT (No. 7, Fig. G)

Location: Lat. 49°14.5′ Long. 125°20.5′ (92F/3W)
Between 500 and 2,000 feet elevation, on east side of Kennedy River, on Klitsa Mountain, 9 miles northeast of northeast tip of Kennedy Lake.

Claims: VENT 10, 12 to 18, 28 to 33, 42 to 50, 52 to 61; VENT 1, 2, 22, 62, 63 Fractions.

Access: By road from Alberni, 23 miles.

Operator: RAW MATERIALS VENTURES INC., 209, 475 Howe Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: The area of the claims is underlain by interbedded volcanic flows, tuffs, and siliceous rocks intruded by diorite and feldspar porphyry. Geological Survey of Canada Map 17-1968 shows a large body of Island Intrusions to the south of the claims. Pyrite and pyrrhotite are found in all rock types with minor chalcopyrite and traces of molybdenite. Mineralization occurs as films coating fractures, in veinlets, disseminations, and stringers.

Work done: Surface geological mapping, 1 inch equals 400 feet on Vent 10, 12, 14, 16, 28 to 33; magnetometer survey, three-quarters of a line-mile covering Vent 10 and 12; geochemical soil survey, 161 samples covering Vent 14, 16, and 28 to 33.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 219; *Geol. Surv., Canada*, Paper 68-50; Assessment Report 2464.

NDB, WCR (No. 38, Fig. G)

Location: Lat. 49°14′ Long. 125°26′ (92F/3W)
At approximately 3,000 feet elevation, on the eastern slope of Mount Maitland, north of Kennedy Lake.

Claims: Eleven NDB, six WCR.

Access: From Tofino–Alberni highway by trail and boat, 2 miles.

Owners: BILL ROTAR and DAVID KING, Box 904, Vernon.

Metals: Iron, copper.

Work done: Road and trail constructed, part of a mile.

GREAT CENTRAL LAKE

HM (No. 13, Fig. G)

Location: Lat. 49°18.5′ Long. 125°06′ (92F/6E)
From 2,200 to 3,500 feet elevation between Great Central Lake and Sproat Lake, 15 miles west-northwest of Port Alberni.

Claims: HM, totalling 14.

Access: By road from Port Alberni, 23 miles.

Owner: GREAT CENTRAL MINES LTD., 3370 Coast Meridian Road, Port Coquitlam.

Metals: Antimony, mercury, copper.

Work done: Geochemical soil survey, 125 samples covering HM 27 to 32, 50, and 55; trenching, approximately 1,000 feet; surface diamond drilling, three holes totalling 400 feet on HM 28 and 32.

HENDERSON LAKE

GE (No. 69, Fig. G)

LOCATION: Lat. 49°03.5′ Long. 125°03.5′ (92F/3E)
Approximately 2 miles north and west of Kildonen on the west side of Henderson Lake.

CLAIMS: GE, totalling 34.

ACCESS: By float plane, helicopter, or boat.

OWNER: G. S. ELDRIDGE, 2907 West 42nd Avenue, Vancouver 13.

METAL: Iron.

WORK DONE: Magnetometer survey of parts of six GE claims.

REFERENCE: Assessment Report 2573.

CORRIGAN CREEK

WWW, JAN (No. 76, Fig. G)

LOCATION: Lat. 49°02′ Long. 124°40.5′ (92F/2E)
On west side of Corrigan Creek, 15 miles south-southeast of Alberni.

CLAIMS: WWW 1 to 4 (Lots 37, 39, 53, 38); JAN 1 to 18.

ACCESS: From Port Alberni, by Franklin River logging-road.

OWNER: JOHN COTOWICK, 626 Howe Street, Vancouver 1.

METALS: Gold, silver.

DESCRIPTION: Gold and silver-bearing quartz veins in coarse-grained intrusives and lesser amounts of volcanic rock.

WORK DONE: Geological survey.

REFERENCE: Assessment Report 2771.

ANDY, PAK (No. 22, Fig. G)

LOCATION: Lat. 49°01′ Long. 124°39′ (92F/2E)
Between 1,200 and 1,800 feet elevation on Logan Peak, at the headwaters of Corrigan Creek, 17 air-miles south 25 degrees east of Port Alberni.

CLAIMS: ANDY 1 to 28, PAK 1 to 22, DOLLY 1 to 16.

ACCESS: By road from Port Alberni, 20 miles.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite, minor molybdenite, pyrrhotite, and pyrite disseminated and filling fractures in granodiorite. Host rocks silicified, sericitized, and biotitized.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet on Andy 5 to 9, 11, 17, 19 to 23, 25, 26, and Pak 18, 20; induced polarization survey, 5.6 line-miles covering Andy 5 to 8, 20 to 22, 25, 26, 28; geochemical soil survey, 81 samples covering Andy 25 to 28; surface diamond drilling, seven holes totalling 3,480 feet on Andy 7, 9, 20, 22.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 76; 1968, p. 104; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 220.

LITTLE NITINAT RIVER

NAT, NIT, LX (No. 19, Fig. G)

LOCATION: Lat. 48°53′ Long. 124°41′ (92C/15E)
Little Nitinat River between elevations of 500 and 1,500 feet.

CLAIMS: NAT 1 to 40; NIT 1 to 35, 37 to 40; LX 1 to 20.
ACCESS: By car from Lake Cowichan, 40 miles.
OWNER: SPACEMASTER MINERALS LTD., 4725 Treetop Heights, Victoria.
METALS: Copper, zinc, silver.
WORK DONE: Trenching, 100 feet; stripping 500 by 10 feet on LX claims.

VICTORIA MINING DIVISION

NITINAT RIVER

MJ, MCC, JW (No. 18, Fig. G)

LOCATION: Lat. 48°50.5′ Long. 124°36.5′ (92C/15E)
Between 600 and 1,000 feet elevation in the Nitinat Lake area, southeast of Nitinat River at and southwest of Jasper Creek.
CLAIMS: Seventy-seven claims and fractions including MJ, MCC, JW, NiCu, EAGLE, ZO, ZOILA Fraction, MIKE (grouped into two groups of 40 and 37 claims known as TB Group 1 and TB Group 2 respectively).
ACCESS: By road from Lake Cowichan, 25 miles.
OWNER: Terrace-Bell Mines Ltd.
OPERATOR: HUDSON BAY MINING & SMELTING CO. LTD., Box 28, Toronto Dominion Centre, Toronto, Ont.
DESCRIPTION: Scattered occurrences of chalcopyrite and pyrite in narrow shear zones in siliceous, pyritized volcanics.
WORK DONE: Reconnaissance surface geological mapping, 1 inch equals 2,400 feet; ground magnetometer survey, 37.8 line-miles covering MJ, MCC, NiCu, and JW claims; geochemical soil survey on grid, 1,400 samples covering the same claims; logging-road repairs on parts of property.
REFERENCE: Assessment Report 2549.

COWICHAN LAKE

ANNE (No. 3, Fig. G)

LOCATION: Lat. 48°55.7′ Long. 124°11.3′ (92C/16E)
At approximately 2,700 feet elevation, on south side of headwaters of Chemainus River, 4 miles north of Youbou, Cowichan Lake.
CLAIMS: ANNE 1 to 12, 23 to 32, 35 to 40.
ACCESS: By logging-road from Chemainus, 30 miles.
OWNER: HIBERNIA MINING CO. LTD., 1101, 207 West Hastings Street, Vancouver 3.
METALS: Copper, molybdenum, gold.
DESCRIPTION: The claims are said to be underlain by andesite and bedded tuff in contact with granodiorite and feldspar porphyry dykes. Mineralization occurs in skarn cut by quartz and calcite veins and consists of chalcopyrite, pyrrhotite, magnetite, pyrite, and molybdenite.
WORK DONE: Surface geological mapping, 1 inch equals 200 feet on Anne 1 to 12 and 27 to 32; electromagnetic survey, 7 line-miles covering Anne 2, 6, 7 to 12, 28, and 30.
REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1948, p. 160; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 223; *B.C. Dept. of Mines*, Bull. 37, p. 57; *Geol. Surv., Canada*, Mem. 13, p. 164; Assessment Reports 1949, 2167.

NAN (No. 46, Fig. G)

Location: Lat. 48°45′ Long. 124°15′ (92C/9W)
Harris Creek, 8 miles south of Cowichan Lake.

Claims: NAN 1 to 6; also lease from Canadian Pacific Oil and Gas Limited covering approximately 2,560 acres.

Access: By road from Duncan, 22 miles.

Owner: GRANDEUR MINES LTD., 24, 448 Seymour Street, Vancouver 2.

Metals: Iron, copper.

Description: Magnetite-chalcopyrite mineralization occurs in skarn along a limestone-volcanic contact. Skarn occurs where east-west or northeast faults cut the contact, and in places mineralization extends for a limited distance along the faults.

Work done: Trenching, 125 cubic yards on Nan 1 and 2.

ALPHA, BETA, HILLCREST (No. 31, Fig. G)

Location: Lat. 48°44.5′ Long. 124°04.5′ (92C/9E)
Between 800 and 2,500 feet elevation on the east fork of Robertson River, 5 miles south of Mesachie Lake.

Claims: Three Crown-granted claims, ALPHA, BETA, TABOGA (Lots 1G, 2G, 3G), and 15 located claims, BURNSIDE, HILLSIDE, HILLTOP, HILLCREST, ANOMALY, ANOMALY 1 to 3, ROSE, DAISY, LENS NORTH, RED DOG, BLACK DOG, FRANK, GINGER.

Access: By road from Lake Cowichan, 10 miles.

Owner: Albeta Mines Ltd.

Operator: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

Metal: Copper.

Description: Chalcopyrite with magnetite in skarn.

Work done: Reconnaissance geochemical survey.

References: *Minister of Mines, B.C.*, Ann. Repts., 1956, p. 122; 1962, pp. 125–127; 1968, p. 106; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 223.

DUNCAN

LENORA, TYEE, RICHARD III (No. 51, Fig. G)

By W. C. Robinson

Location: Lat. 48°52′ Long. 123°47′ (92B/13W)
Between 1,000 and 2,000 feet elevation on Mount Sicker.

Claims: Thirty-four Crown-granted claims, including the LENORA (Lot 35G), TYEE (Lot 36G), RICHARD III (Lot 39G), 64 recorded claims, and 2,540 acres leased in Esquimalt and Nanaimo land belt.

Access: By road from Duncan, 15 miles.

Owner: Mount Sicker Mines Ltd.

Operators: MOUNT SICKER MINES LTD., Box 576, Victoria, and COLORADO CORPORATION, 200 Brooks Towers Building, Denver, Colo. 80202.

Metals: Gold, silver, copper, zinc.

Description: Massive to partial replacement of metasediments and metavolcanics of the Sicker Group by pyrite, chalcopyrite, sphalerite, and minor galena. Gangue includes quartz, barite, and calcite.

Work done: Claims mapped (in part); surface workings mapped; surface geological mapping, 1 inch equals 200 feet and 1 inch equals 50 feet; electromagnetic survey, 30.6 line-miles; magnetometer survey, 29.2 line-miles; geochemical soil survey, 1,800 samples; road construction, three-quarters of a mile on the southeast section of the property; trenching, 1,000 feet; surface diamond drilling, three holes totalling approximately 275 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1902, pp. 238–252; 1943, p. 69; 1967, p. 79; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 224.

SIRIUS (No. 6, Fig. G)

LOCATION: Lat. 48°51′ Long. 123°39.5′ (92B/13E)
At approximately 800 feet elevation, 1½ miles southwest of Crofton.

CLAIMS: SIRIUS 1 to 27.

ACCESS: By road from Highway 1, 3 to 7 miles.

OWNER: CANPAC MINERALS LIMITED, 205 Ninth Avenue SE., Calgary 21, Alta.

METAL: Copper.

DESCRIPTION: The claims are underlain by Sicker volcanic flows and tuffs intruded by quartz feldspar porphyry and gabbro-diorite. Old trenches, shafts, and adits follow small shear zones and quartz veins. Minor amounts of chalcopyrite occur in a quarry at the Yreka shaft dump. Very weak concentrations are found locally within mafic-rich volcanic rocks and within intrusive rocks.

WORK DONE: Topography and surface workings mapped; surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 37.4 line-miles; geochemical soil survey, 2,500 samples covering all claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 224; Assessment Report 2397.

PORT RENFREW

LELLA (No. 44, Fig. G)

LOCATION: Lat. 48°33′ Long. 124°25′ (92C/9W)
At approximately 300 feet elevation, Port Renfrew area, Vancouver Island.

CLAIMS: LELLA 1 to 10.

ACCESS: From Port Renfrew by road, 2 miles.

OWNER: PERBELL MINES LTD., 4190 Balaclava Street, Vancouver 8.

METAL: Copper.

WORK DONE: Trenching, 60 cubic yards on Lella 1 to 10.

SUE, JIM, CATY, VAL (No. 45, Fig. G)

LOCATION: Lat. 48°36′ Long. 124°25′ (92C/9W)
At approximately 300 feet elevation, Port Renfrew area, Vancouver Island.

CLAIMS: SUE 1 to 14, JIM 1 to 10, CATY 1 to 24, VAL 1 to 18.

ACCESS: From Port Renfrew by road, 3 miles.

OWNER: PERBELL MINES LTD., 4190 Balaclava Street, Vancouver 8.

METAL: Copper.

WORK DONE: Geochemical survey, 1,000 samples covering 40 claims.

JORDAN RIVER

SUNLOCH AND GABBRO (No. 50, Fig. G)

By W. C. Robinson

LOCATION: Lat. 48°26.5′ Long. 124°02.2′ (92C/8E)
The mine is 1 mile north of the mouth of Jordan River.

ACCESS: One mile by road from the turnoff on Highway 14, one-half mile east of River Jordan Post Office.

Owner: Dison Development Ltd. (The company has an operating lease from Sunro Mines Ltd. to mine on 51 contiguous claims which cover the Cave, Central, and River ore zones.)

Operator: PECHINEY DEVELOPMENT LIMITED, 744 West Hastings Street, Vancouver 1.

Metal: Copper.

Work done: During October, rehabilitation and development work was begun underground. Drifting and crosscutting, 1,550 feet; raising, 108 feet; diamond drilling, 1,648 feet. At the year-end, 41 men were employed.

References: *Minister of Mines, B.C.*, Ann. Repts., 1950, pp. 180–193; 1962, pp. 127–129; 1968, p. 106; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 224.

JAN (No. 33, Fig. G)

Location: Lat. 48°27.5′ Long. 124°01′ (92C/8E)
At approximately 500 feet elevation, north of Jordan River.

Claims: JAN 1 to 36.

Access: By Highway 14 from Jordan River, 3 miles.

Operator: WESTERN MINES LIMITED, Box 8000, Campbell River.

Metal: Copper.

Description: Chalcopyrite, pyrite, and pyrrhotite occur as disseminations in sheared andesite adjacent to a Tertiary intrusive.

Work done: Surface geological mapping, 1 inch equals 600 feet on Jan 1 to 36; underground geological mapping, 1 inch equals 200 feet through British Columbia Hydro penstock; induced polarization survey, 5 line-miles covering Jan 1 to 36.

MEAD (formerly REN) (No. 68, Fig. G)

Location: Lat. 48°22–23′ Long. 124°06–12′ (92C/8E)
Four to 8 miles west of Jordan River.

Claims: MEAD 1 to 112.

Access: From Jordan River townsite via 4 miles of gravel road leading to Port Renfrew.

Owner: QUINTANA MINERALS CORPORATION, 1215, 555 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Assessment Report 2229 states that the Mead claims are underlain by sheared, altered, interbedded Metchosin basaltic tuffs, amygdaloidal flows, and pillow lavas. These rocks are cut by sheared and altered steep-dipping, easterly striking gabbro dykes, commonly 100 to 150 feet wide, the largest being one-half mile wide. Hornblende granite intrudes these older rocks forming breccia zones. Hornblende-rich and pegmatitic differentiates from the granite form basic hornblendite and acid pegmatite groundmass between breccia fragments of older rocks. Sooke sedimentary rocks overlie the southern and lower parts of the area. Pyrrhotite, pyrite, minor chalcopyrite, some bornite, and flecks of native copper are reported at areas of most intense shearing and the more significant mineralized zones occur close to gabbro or other basic dykes and associated with systems of feldspathic stringers.

Work done: During 1969, geological mapping, a geochemical soil survey, and a photogeological study were done.

References: Assessment Reports 549 (REN), 2229.

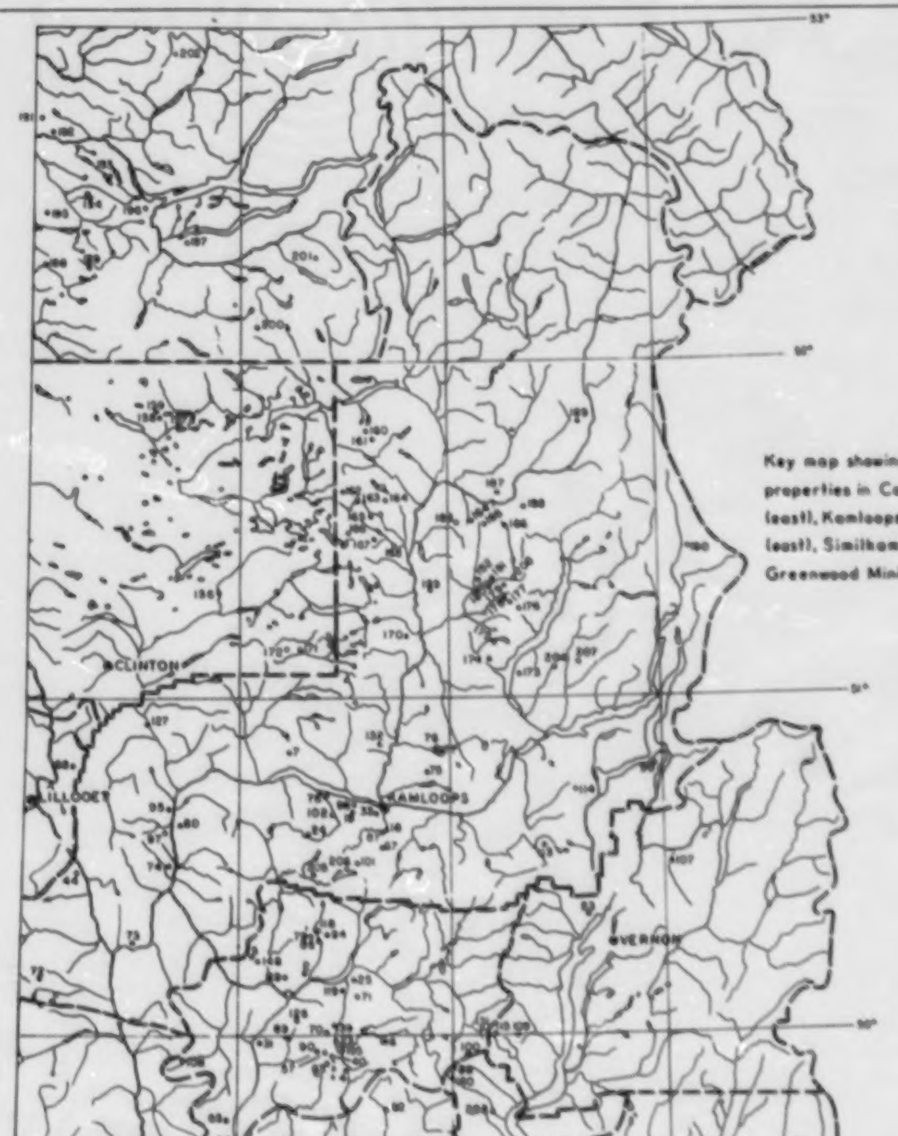

53°
52°
CLINTON
51°
LILLOOET
KAMLOOPS
VERNON
50°
PENTICTON
PRINCETON
49°
122°
121°
120°
119°
SCALE 0 10 20 30 MILES

Figure H

Key map showing locations of mining properties in Cariboo (southeast), Clinton (east), Kamloops, Nicola, New Westminster (east), Similkameen, Osoyoos, Vernon, and Greenwood Mining Divisions.

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107 EF, DK, DCK, page 407.
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110 E, page 408.
111 PR, TOKYO, page 431.
112 NICKEL MT, V & H, page 431.
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114 GALAXY, NOVA, page 319.
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116 SHR, JOY, page 388.
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118 SMOKIE, ACA, CON, page 374.
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136 MAE, KERRY, page 384.
137 AXE, SKI, page 384.
138 RED STAR, SPENHO, page 386.
139 AM, page 251.
140 PRIDE OF EMORY MINE, page 248.
141 HIGHLAND BELL MINE, page 409.
142 MIDWAY, page 412.
143 COMBINATION, page 430.
144 PHOENIX MINE, page 428.
145 ORO DENORO, page 430.
146 HORN SILVER MINE, page 394.
147 GOLCONDA, page 395.
148 CRAIGMONT MINE, page 273.
149 ILK, ELK, FRI, PR, page 386.
150 BRENDA MINE, page 391.
151 REDCAP, SUE, page 406.
152 SUSAP, SUP, BUCK, page 395.
153 NEWT, page 393.
154 SUN, SIG, DAN, page 392.
155 AU, page 379.
156 BD, VB, WIN (Dansey-Rayfield River), page 218.
157 SODA, page 217.
158 DB, page 217.
159 OGDEN, page 217.
160 CS, page 303.
161 WET, SUN, AKU, page 303.
162 SO, RL, page 304
163 RO, TC, page 304.
164 ANTICLIMAX (MO), page 304.
165 SILVER, page 312.
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167 KEY, page 313.
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169 L, K, page 313.
170 PC, page 316.
171 LERIC, TERNAN, page 222.
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173 VIC, page 317.
174 HOMESTAKE, page 317.
175 MF, K, page 316.
176 SC, page 316.
177 BEX, page 315.
178 GRIZZLY, CU, KEN, SOU, page 315.
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201 CS, EN, page 211.
202 BON, PARK, ROUNDTOP, page 207.
203 SID, KC, page 392.
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KAMLOOPS MINING DIVISION

AVOLA

MOLCOP (No. 189, Fig. H)

LOCATION: Lat. 51.50′ Long. 119°22′ (82M/14W)
Between 3,100 and 3,800 feet elevation, 5 miles northwest of Avola.

CLAIMS: MOLCOP 1 to 24.

ACCESS: By truck-road from Highway 5 at Avola, 5 miles northwest.

OWNER: GRANITE MOUNTAIN MINES LTD., 330, 470 Granville Street, Vancouver 2.

DESCRIPTION: The claims occupy an area underlain by rocks of the Shuswap Metamorphic Complex which include granitic and metasedimentary gneiss, schist, quartzite, marble, skarn, pegmatite, and muscovite granite. No specific information has been obtained regarding the nature and extent of the mineralization, if any, exposed.

WORK DONE: Induced polarization survey, 1½ line-miles on Molcop 1 to 24; geochemical stream sediment survey, 24 samples; surface diamond drilling, two holes totalling 231 feet on Molcop 5 and 6.

VAVENBY

ESP (No. 188, Fig. H)

LOCATION: Lat. 51°33–37′ Long. 119°33–42′ (82M/12E)
Between 3,500 and 4,000 feet elevation, 1½ to 8 miles east of Vavenby.

CLAIMS: ESP, 218 in all.

ACCESS: By gravel road from Yellowhead highway at Vavenby, 5 miles.

OWNER: NICANEX MINES LTD., 821, 602 West Hastings Street, Vancouver 2.

METAL: Copper.

DESCRIPTION: Pyrrhotite, pyrite, and chalcopyrite occur disseminated and in conformable lenses in chlorite and quartz sericite schist.

WORK DONE: Topographical mapping; surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 7.5 line-miles; magnetometer survey, 15 line-miles; geochemical survey, 1,800 soil samples, 200 stream sediment samples, and 10 stream heavy mineral samples; surface diamond drilling, three holes totalling 1,123 feet on ESP 21, 22, and 25.

REFERENCES: Assessment Reports 2676, 2677, 2678.

TINKIRK (No. 187, Fig. H)

LOCATION: Lat. 51°36′ Long. 119°46′ (82M/12W)
East side of Peavine Creek, 4 miles west of Vavenby.

CLAIMS: TINKIRK 1, 2.

ACCESS: By trail from Highway 5, 1½ miles.

OWNERS: E. KIRK, 1284 Fairview, Kamloops, and BILL TINDILL, Vavenby.

METALS: Silver, lead.

DESCRIPTION: Permian or older metamorphic rocks contain quartz veins mineralized with pyrite and galena in narrow seams.

WORK DONE: Trenching and tunnel work.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 228.

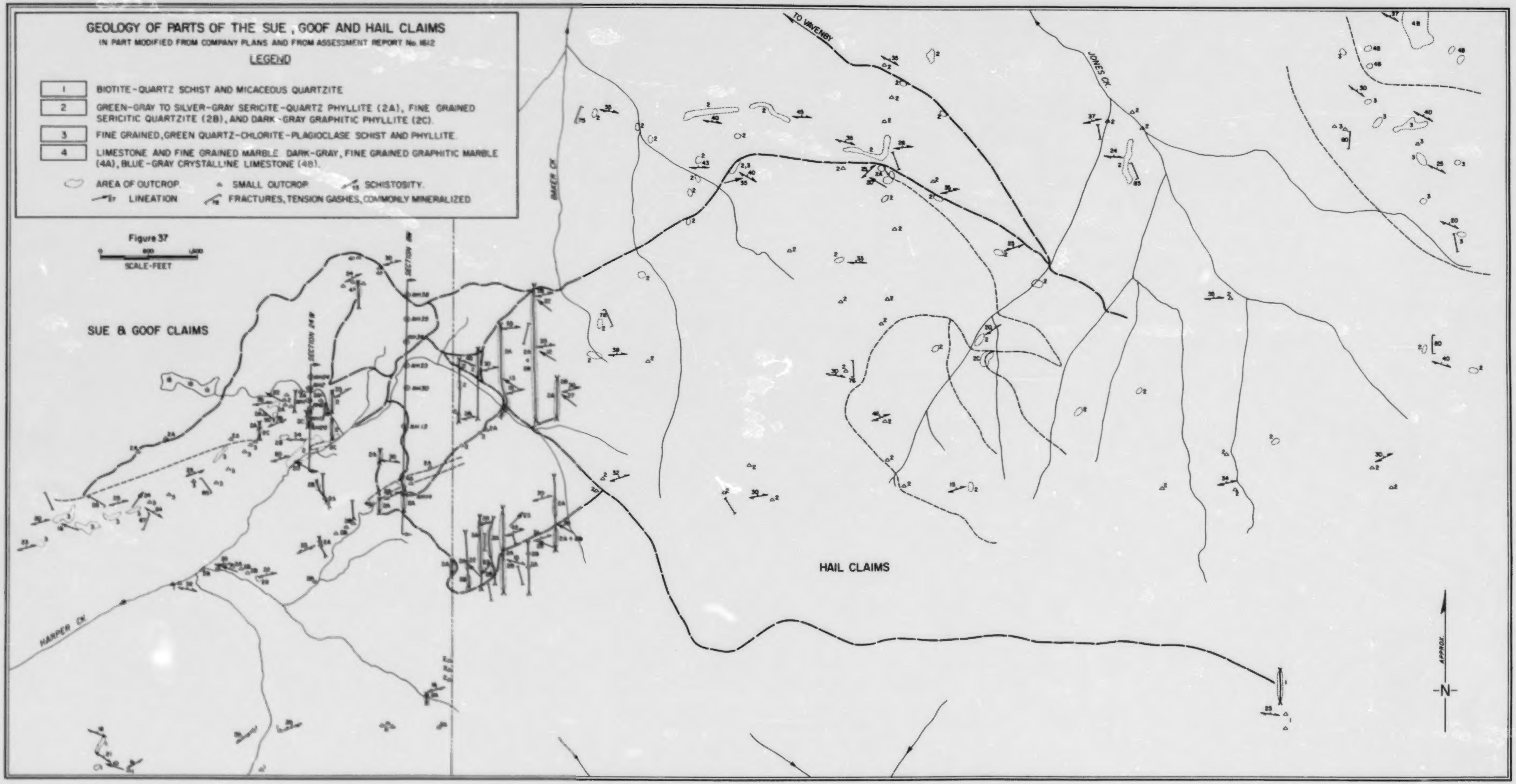

GEOLOGY OF PARTS OF THE SUE, GOOF AND HAIL CLAIMS
IN PART MODIFIED FROM COMPANY PLANS AND FROM ASSESSMENT REPORT No. 1612
LEGEND
1 BIOTITE-QUARTZ SCHIST AND MICACEOUS QUARTZITE
2 GREEN-GRAY TO SILVER-GRAY SERICITE-QUARTZ PHYLLITE (2A), FINE GRAINED SERICITIC QUARTZITE (2B), AND DARK-GRAY GRAPHITIC PHYLLITE (2C).
3 FINE GRAINED, GREEN QUARTZ-CHLORITE-PLAGIOCLASE SCHIST AND PHYLLITE.
4 LIMESTONE AND FINE GRAINED MARBLE. DARK-GRAY, FINE GRAINED GRAPHITIC MARBLE (4A), BLUE-GRAY CRYSTALLINE LIMESTONE (4B).
AREA OF OUTCROP.
SMALL OUTCROP.
SCHISTOSITY.
LINEATION
FRACTURES, TENSION GASHES, COMMONLY MINERALIZED
0
800
1600
SCALE-FEET
SUE & GOOF CLAIMS
HAIL CLAIMS
TO VAVENBY
JONES CK.
BAKER CK.
HARPER CK.
SECTION 24 W
APPROX.
-N-

Figure 37

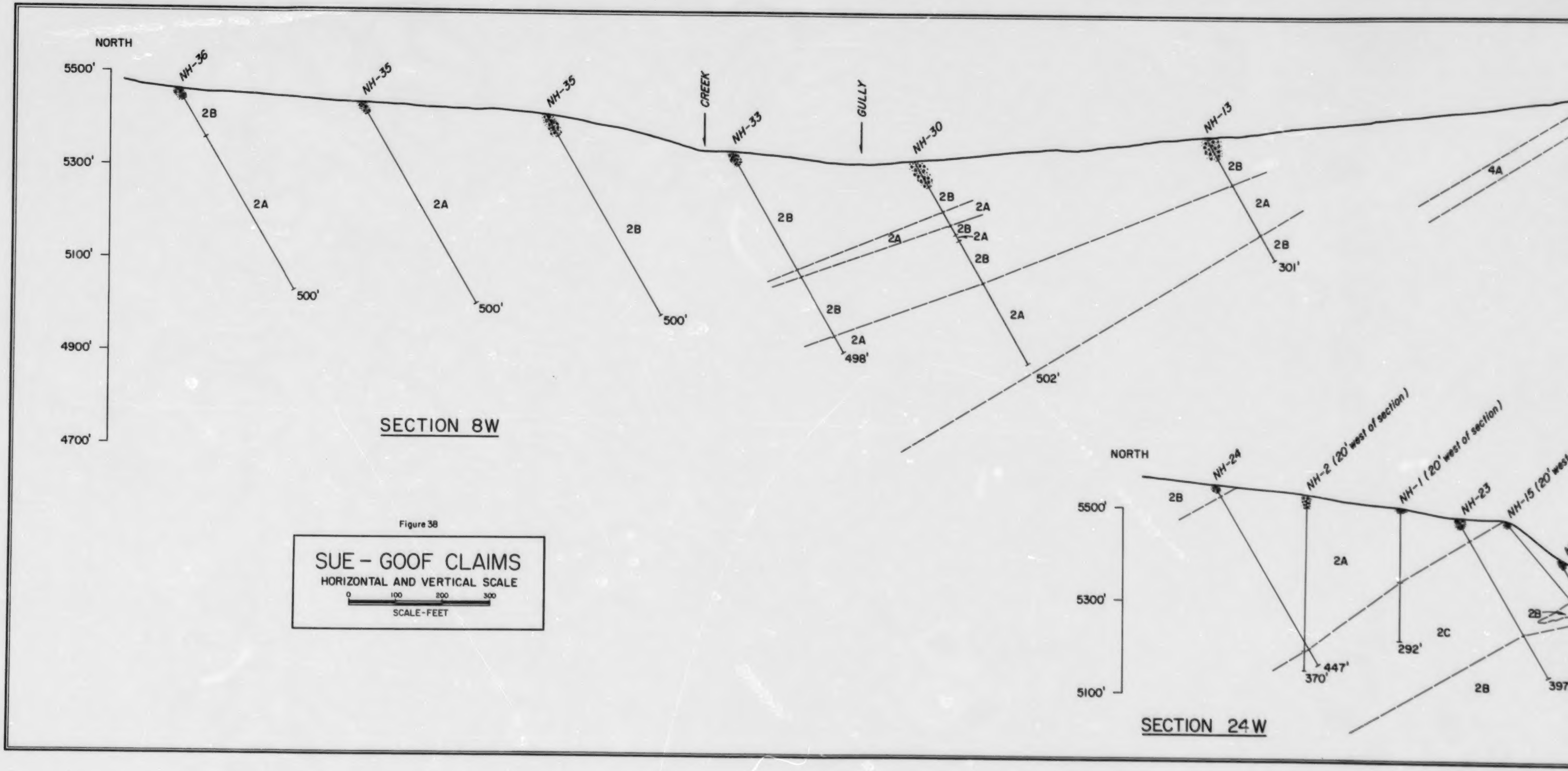
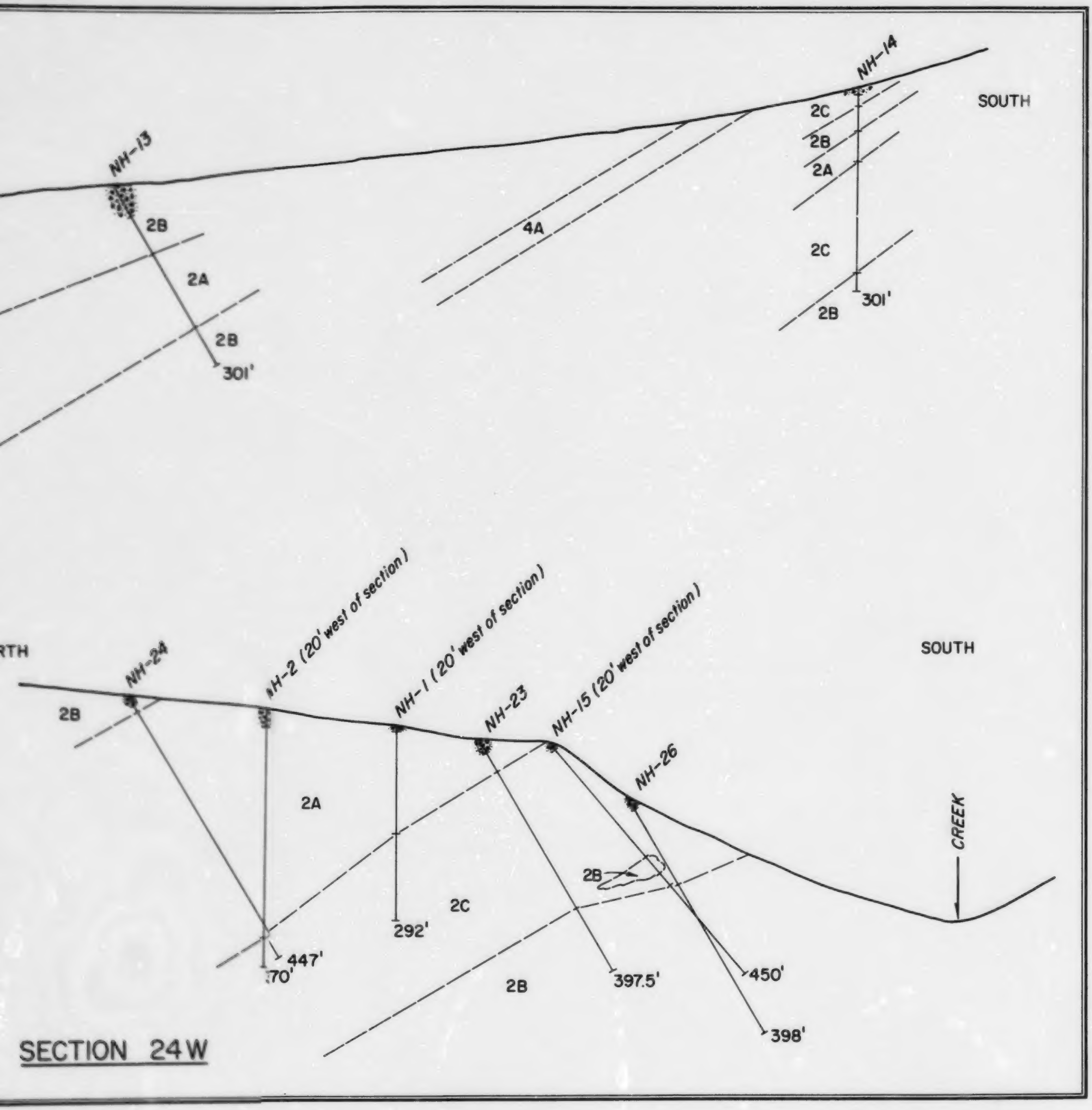

NORTH
5500'
5300'
5100'
4900'
4700'
NH-36
NH-35
NH-35
CREEK
NH-33
GULLY
NH-30
NH-13
2B
2A
2B
2A
2B
2A
2B
2A
2B
2A
2B
2A
2B
2A
2B
2A
4A
500'
500'
500'
498'
502'
301'
SECTION 8W
NORTH
5500'
5300'
5100'
NH-24
NH-2 (20' west of section)
NH-1 (20' west of section)
NH-23
NH-15 (20' west
2B
2A
2C
2B
2B
447'
370'
292'
397
SECTION 24 W

Figure 38

SUE - GOOF CLAIMS

HORIZONTAL AND VERTICAL SCALE

0
100
200
300
SCALE-FEET


NH-13
2B
2A
2B
301'
4A
NH-14
2C
2B
2A
2C
2B
301'
SOUTH
RTH
NH-24
2B
H-2 (20' west of section)
NH-1 (20' west of section)
NH-23
NH-15 (20' west of section)
NH-26
2A
2C
2B
2B
CREEK
447'
70'
292'
397.5'
450'
398'
SOUTH

SECTION 24W

VM (No. 186, Fig. H)

Location: Lat. 51°29–31′ Long. 119°42–44′ (82M/12E, 5E)
At approximately 4,000 feet elevation, 5 miles south of Vavenby, at headwaters of Barriere River.

Claims: VM 1 to 80.

Access: By road from Vavenby, 6 miles.

Owner: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

Metal: Copper.

Description: Chalcopyrite is reported to occur as disseminations in gneiss and schist along the northern contact of the Upper Cretaceous Baldy Batholith.

Work done: Geochemical soil and stream sediment survey, 480 samples on VM 1 to 48.

GOOF, SUE, HAIL (No. 185, Fig. H)

By V. A. G. Preto

Location: Lat. 51°30–33′ Long. 119°45–52.6′ (82M/12W)
At elevations of 4,000 to 6,300 feet, at the headwaters of Jones, Baker, and the northeastern fork of Harper Creeks, approximately 7 miles southwest of the village of Vavenby.

Claims: GOOF, SUE, HARP, BETH, LEO (Noranda Exploration Company, Limited); HAIL (Quebec Cartier Mining Company).

Access: Via 10 miles of logging-road which branches off the gravel road which follows the south bank of the Thompson River 1½ miles west of Vavenby.

Owners: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5 (Goof, Sue, Harp, Beth, Leo), and QUEBEC CARTIER MINING COMPANY, 1418, 355 Burrard Street, Vancouver 1 (Hail).

Metal: Copper.

Description:

History

Recent exploration activity on and near the claims began in April 1966, when Noranda Exploration Company, Limited staked the Sue and Goof claims as a result of geochemical reconnaissance work. This was followed in June 1966 by the staking of the Hail claims for Quebec Cartier Mining Company.

To date, extensive work including line-cutting, geological, geophysical, and geochemical surveys, and much diamond drilling, bulldozer trenching, and sampling has been done on both properties. Encouraging results have been obtained that indicate the existence of a large, low-grade copper deposit approximately straddling the boundary between the two properties. No figures as to the size and grade of the mineralization have yet been made public. Some details of the work done on the Hail claims have been presented in Assessment Report 1612, dated May 1968.

Geology

The area occupied by the Sue, Goof, and Hail claims is generally covered by thick spruce and balsam forest and, at higher elevations, dotted by several marshy alpine meadows. Drift cover is extensive and generally several feet thick, hence rock exposures are generally small and sparse, except for the northwestern side of Harper Creek and the extreme northeastern corner of the area of Figure 37. Collection of data for detailed structural analysis is hampered by the uneven distribution and low quality of rock exposures.

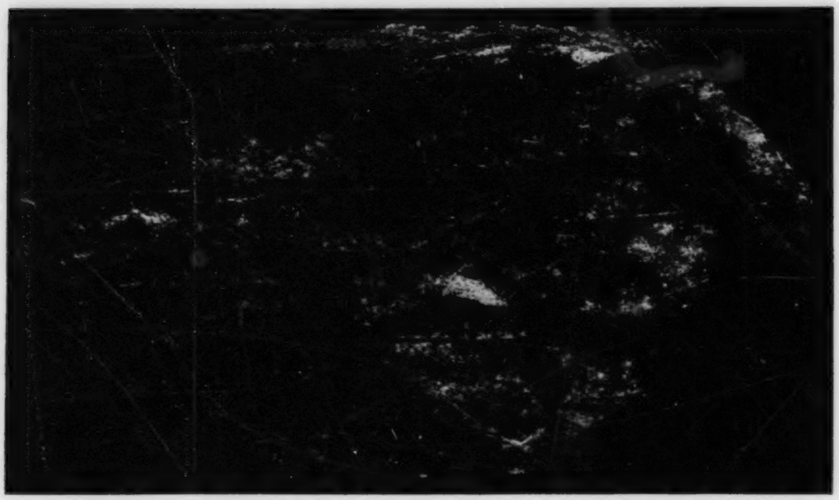


Plate XIIIA.—Sue-Goof claims. Tension gashes in chlorite phyllite. Early lineation at approximately 45 degrees to gashes. Specimen 8 inches long.

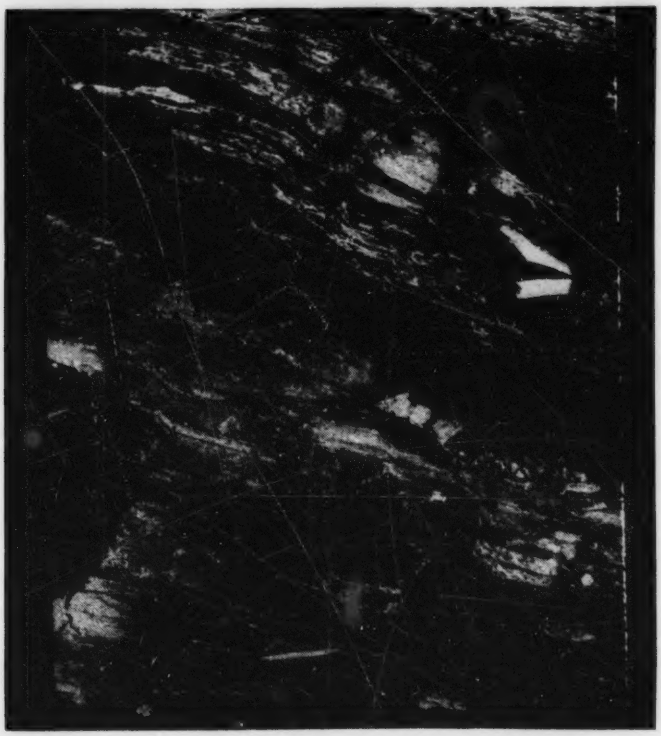


Plate XIIIB.—Sue-Goof claims. Late kinks in rusty weathering phyllite. Looking northwest.

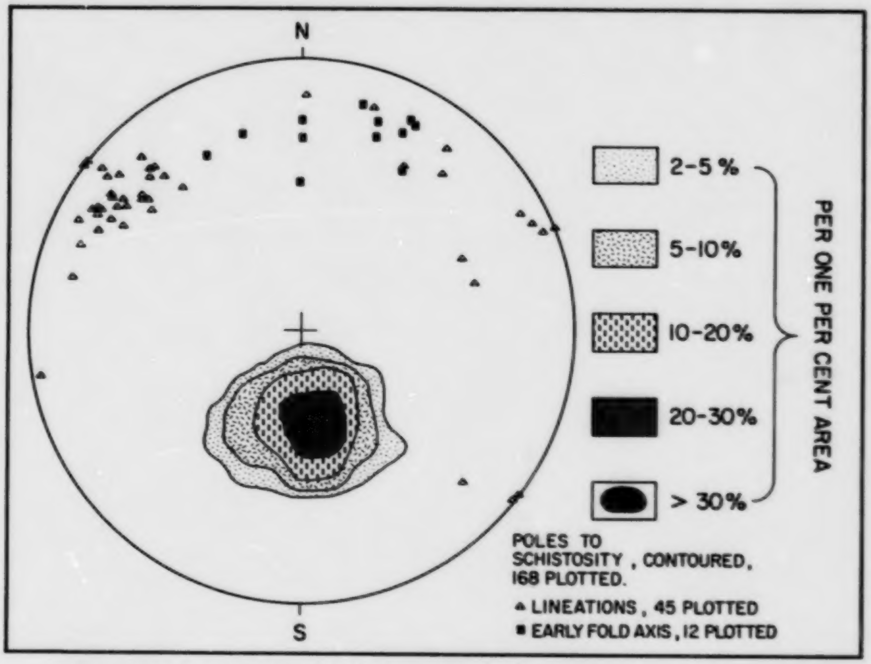


Figure 39. Sue, Goof, and Hail claims, plot of poles to schistosity, lineations, and early fold axes.

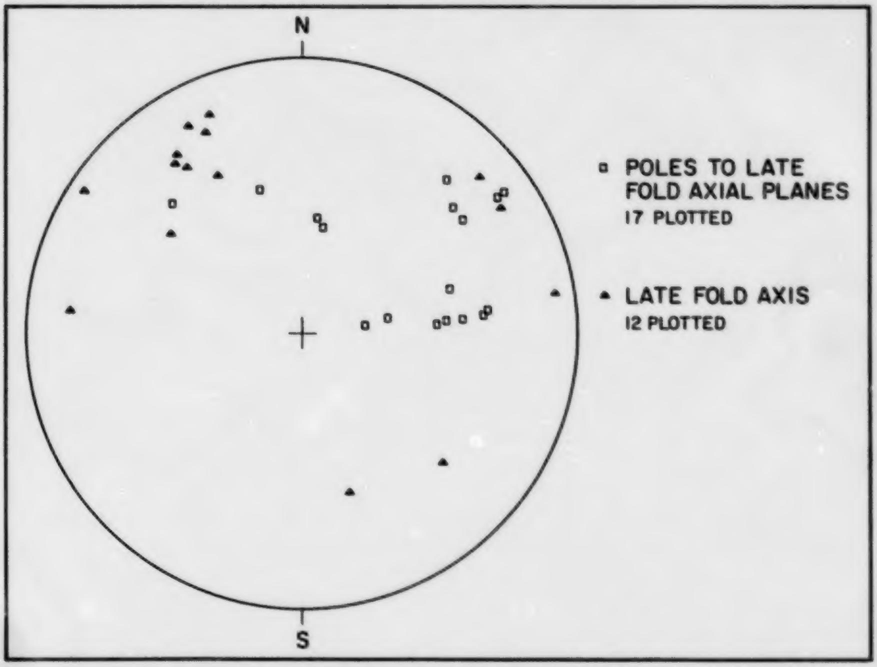


Figure 40. Sue, Goof, and Hail claims, plot of poles to late fold axial planes and of late fold axes.

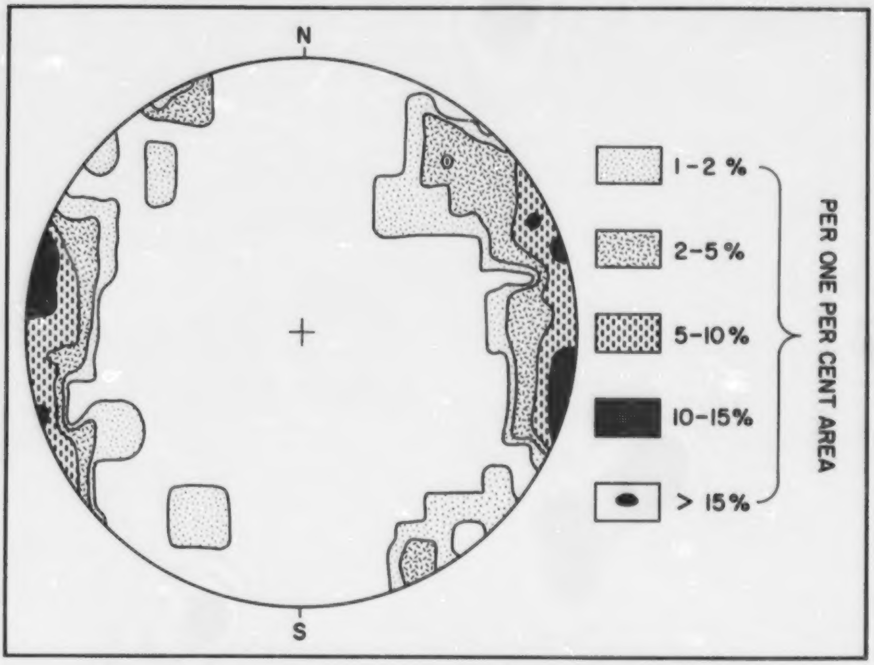


Figure 41. Sue, Goof, and Hail claims, plot of poles to fractures, 58 plotted.

The area covered by the claims lies a short distance to the north of the Cretaceous Baldy Batholith and is underlain by low-grade metamorphic rocks of Permian or earlier age (*see Geol. Surv., Canada,* Map 48-1963). Within the area of Figure 37, these rocks consist of a succession of fine-grained phyllitic greenschist, fine-grained graphitic marble and impure limestone, dark-grey phyllite, and fine-grained sericitic quartzite.

Intrusive rocks in the area of Figure 37 are limited to several reported occurrences of porphyritic diabase on the Hail claims and to a few reported small outcrops of gneissic granodiorite in the western part of the area along Harper Creek. Several small stringers of quartz-potash-feldspar-dolomite pegmatite, and many quartz veins with or without dolomite, are also found, predominantly in the areas of mineralization.

The metamorphic grade in the northern part of the area is generally of low greenschist facies, but a gradual increase in grade toward the south is indicated by increasing grain size and development of gneissic texture (Assessment Report 1612). This, together with the few small outcrops of gneissic plutonic rock reported along Harper Creek, might indicate the proximity of the Baldy Batholith, and might thus extend the contact approximately 1 mile farther north than indicated on Geological Survey of Canada Map 48-1963.

The metamorphic rocks generally display a very well developed foliation which, as synoptically shown on Figure 39, trends fairly uniformly east-northeast and dips gently to the north. A very fine lineation almost invariably present on the foliation is produced by tiny crinkles of micaceous folia, and in most places plunges gently northwest. Excellent examples of early folds affecting the foliation in fine-grained phyllitic greenschist may be observed in cliffs north of Harper Creek, in the western part of the area mapped. These folds are here almost completely recumbent and subisoclinal. Their axes, though somewhat difficult to determine, plunge gently in a northerly direction (*see* Fig. 39). Several of these early folds are S-shaped and show a relative sense of movement of east over west. Affecting the early folds are small, upright, chevron, or kink folds which are generally Z-shaped and show a relative sense of movement of west side up (*see* Plate XIIIB). The direction and plunge of the axes of these folds vary considerably as shown on Figure 40.

Fractures are common and most trend slightly east of north and dip steeply (*see* Fig. 41), but a considerable variation from this attitude is found. At several localities and in drill core, subvertical fractures, that on the surface trend northerly, occur *en echelon* (*see* Plate XIIIA). These fractures contain or are very close to the axial planes of kink folds and are coated with pyrite, chalcopyrite, and chlorite. It appears that they are genetically related to the kink folds, and may have started as shear planes during the formation of the kinks, to open later as tension fractures in a period of stress relaxation. They must have preceded at least some of the mineralization as they clearly contain sulphides and chlorite which is probably of hydrothermal origin.

The extent, shape, and size of mineralized zones are, to this writer's knowledge, still not very well known. Appreciable copper mineralization is found over an area, elongated east-west and approximately straddling the boundary between the Sue, Goof, and Hail groups, which is in the order of 6,000 feet long and 4,000 feet wide.

Copper appears to be the only important metal occurring on the claims, and is found chiefly as chalcopyrite. Pyrite, pyrrhotite, and magnetite are common and widespread. Magnetite forms massive lenses or sheets several scores of feet thick in parts of the Hail claims. Arsenopyrite, sphalerite, galena, and traces of molybdenite are present in minor amounts.

Copper mineralization occurs in very diverse manner. It is found as thin coatings on steeply dipping fractures, as coarse disseminations and stringers in quartz and quartz-dolomite veins, as lenses that are generally concordant with the foliation in the schists, as fine-grained disseminations along foliation planes, and in lenses, sheets, and large patches of pyrite and pyrrhotite. Chalcopyrite, though widespread, is found in economically important amounts largely in grey to light-grey sericite-quartz phyllite of unit 2a or in silvery grey, fine-grained sericitic quartzite of unit 2b. Sphalerite and galena are found more commonly in more calcareous rocks, and especially some of the graphitic marble of unit 4a.

WORK DONE: Topography and surface workings mapped; induced polarization survey, 3¼ line-miles covering Sue 3 and 5 to 8 and Goof 2, 4, 5, 11, 13, and 15; geochemical soil survey, 262 samples covering Sue 11, 15, 16, 22, 23, and 26 to 33; trenching, 5,000 feet on Goof 3 and 4, and Sue 1 to 4, 20, 21, and 26 to 61; surface diamond drilling, 57 holes totalling 27,279 feet on Goof 2, 4, 6, 11, 13, 15, and 33, and Sue 2, 4, 26, 27, and 29.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 132; 1968, p. 165; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 229 (Goof, Sue); Assessment Reports 1035, 1612 (Hail).

BIRCH LAND

REXSPAR (No. 184, Fig. H)

By B. Sadar

LOCATION: Lat. 51°33′ Long. 119°55′ (82M/12W)
On southern slope of North Thompson Valley, centred at about 4,000 feet elevation on Foghorn Creek, 3 miles south of Birch Island.

Claims: TOP, PA, JAM, CS, ELLA, ACTIVE, RADIO, JANE, RAY located claims and 40 Crown-granted claims, totalling 321.

Access: From Birch Island by road, 7 miles.

Owner: Consolidated Rexspar Minerals and Chemicals Limited.

Operator: DENISON MINES LIMITED, 20th Floor, 4 King Street West, Toronto 105, Ont.

Metals: Uranium, fluorite, molybdenite, lead, rare earths, celestite.

Description: Hydrothermal replacement deposits in tuffaceous trachyte. Lead occurs in quartz veins.

Work done: Surface geological mapping, 1 inch equals 300 feet on the Active claims; scintillometer survey, 63.2 line-miles covering the Active claims; geochemical soil survey, 764 samples covering the Ray claims and 221 samples covering the Fluorite zone; surface diamond drilling, 26 holes totalling 3,908 feet on the Fluorite zone.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 229; Assessment Report 2337.

RAY (No. 184, Fig. H)

Location: Lat. 51°30–32′ Long. 119°52–54′ (82M/12W)
Five miles south of Birch Island, on the east side of upper Foghorn Creek.

Claims: RAY 1 to 52.

Access: From Birch Island by 12 miles of dry-weather dirt road.

Owners: Consolidated Rexspar Minerals and Chemicals Limited and Canadian Nepheline Corporation Limited.

Operator: DENISON MINES LIMITED, 4 King Street West, Toronto, Ont.

Description: The claims are located immediately to the north of the Cretaceous Baldy Batholith, and are underlain by sericite-chlorite and biotite-chlorite schists of Permian or older age. In the southern portion of the claim group, closer to the batholith, the schist locally changes to gneiss. Foliation in the metamorphic rocks strikes north 75 degrees west to north 20 degrees east and dips at 20 degrees to the northeast and northwest. Pyrite, magnetite, and limonite are widespread on the property.

Work done: Geochemical survey for copper and molybdenum over entire property.

References: *Geol. Surv., Canada*, Map 48-1963; Assessment Report 2810.

GOPHER (No. 183, Fig. H)

Location: Lat. 51°32′ Long. 119°57′ (82M/12W)
At approximately 5,500 feet elevation on Foghorn Mountain.

Claims: GOPHER 1 to 14.

Access: By road from Birch Island, 14 miles.

Owner: BARRIERE EXPLORATIONS LTD., Box 17, Barriere.

Metals: Copper, lead, zinc.

Description: Copper, lead, and zinc are reported to occur in greenschist and quartz-sericite schist cut by quartz-bearing intrusives.

Work done: Surface diamond drilling, one hole totalling 140 feet on Gopher 1.

FOGHORN (No. 183, Fig. H)

Location: Lat. 51°32′ Long. 119°56′ (82M/12W)
At approximately 5,400 feet elevation, 10 miles south of Birch Island on Foghorn Creek.

WET, SUN & AKU CLAIMS
GEOLOGICAL SKETCH OF TRENCH AREA

▨ MEDIUM GRAINED LEUCOCRATIC BIOTITE QUARTZ MONZONITE.

▥ QUARTZ FELDSPAR PORPHYRY.

48 ATTITUDE OF PROMINENT FRACTURE SET.

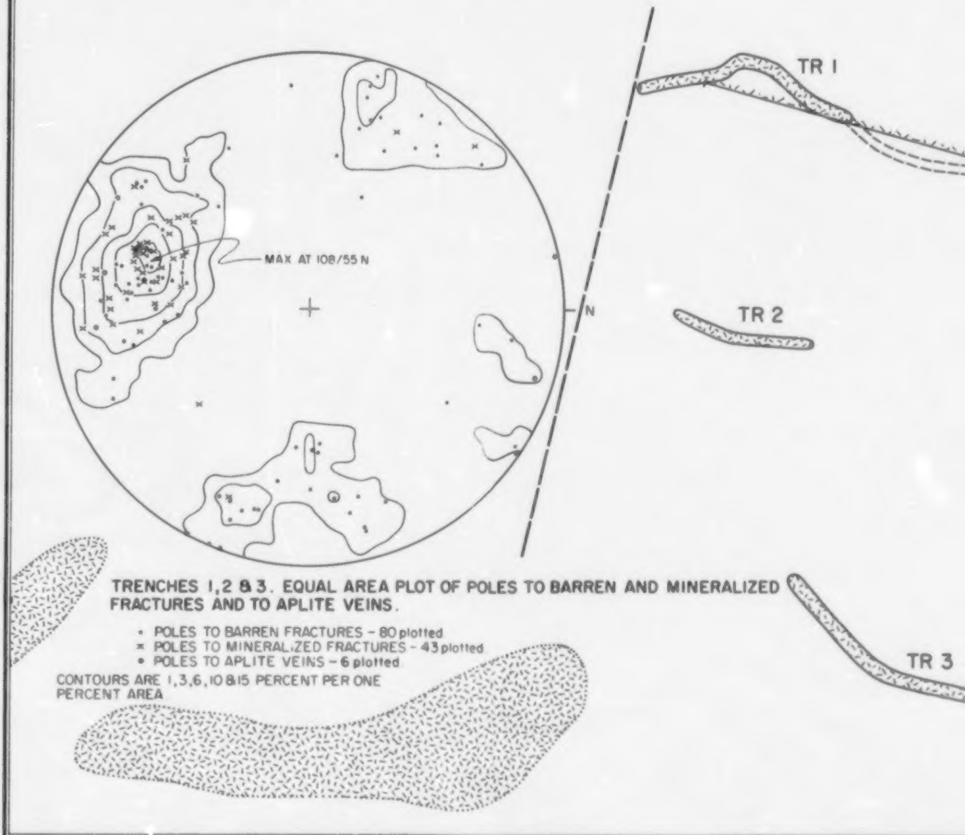
— — APPROXIMATE OUTLINE OF MINERALIZED FRACTURE ZONE.

◌ OUTLINE OF ROCK EXPOSURE.

0 100 200

SCALE-FEET

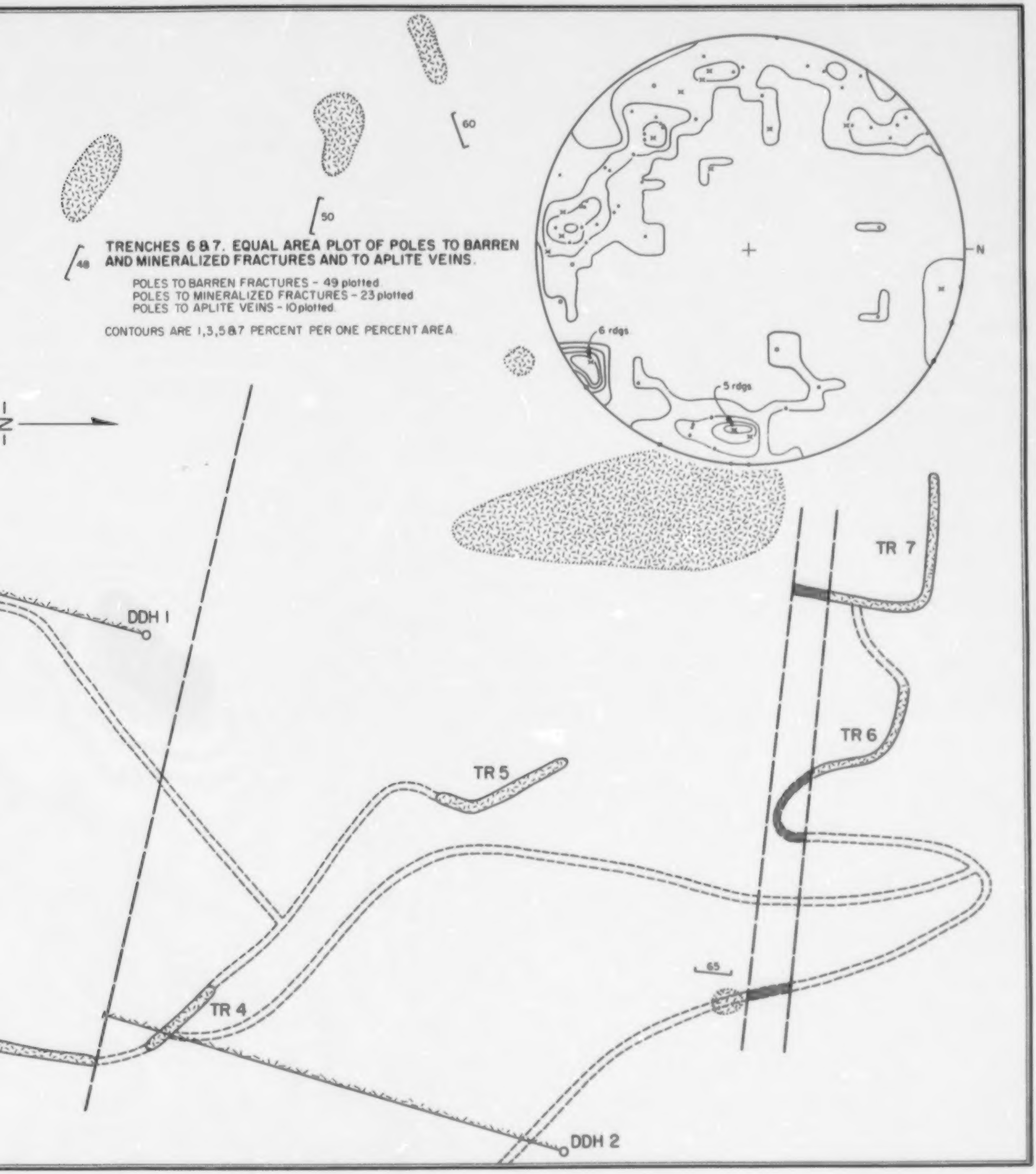
Figure 42



TRENCHES 1,2 & 3. EQUAL AREA PLOT OF POLES TO BARREN AND MINERALIZED FRACTURES AND TO APLITE VEINS.

- · POLES TO BARREN FRACTURES – 80 plotted
- × POLES TO MINERALIZED FRACTURES – 43 plotted
- • POLES TO APLITE VEINS – 6 plotted

CONTOURS ARE 1,3,6,10 & 15 PERCENT PER ONE PERCENT AREA



TRENCHES 6 & 7. EQUAL AREA PLOT OF POLES TO BARREN AND MINERALIZED FRACTURES AND TO APLITE VEINS.

POLES TO BARREN FRACTURES - 49 plotted
POLES TO MINERALIZED FRACTURES - 23 plotted
POLES TO APLITE VEINS - 10 plotted

CONTOURS ARE 1,3,5 & 7 PERCENT PER ONE PERCENT AREA

60
50
48
N
6 rdgs
5 rdgs
N
TR 7
DDH 1
TR 6
TR 5
65
TR 4
DDH 2

Claims: FOGHORN, FH, IMP, KELLY, CLAUDINE Fractions, 76 in all.
Access: By four-wheel-drive truck from Birch Island, 10 miles.
Operator: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.
Metal: Copper.
Description: Pyrite and chalcopyrite occur in lenses and stringers with quartz in chlorite and quartz-sericite schist.
Work done: Surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 22.7 line-miles; electromagnetic survey, 37 line-miles; geochemical soil survey, 450 samples on FH and Imp; 1 to 2 miles of drill-hole access road constructed; surface diamond drilling, two holes totalling 1,002 feet on FH; underground diamond drilling, three holes totalling 1,560 feet on FH.
References: *Minister of Mines, B.C.*, Ann. Repts., 1915, p. 221; 1917, p. 236; 1918, p. 234; 1923, p. 154 (*see* Lydia Mine).

CLEARWATER

CS (No. 160, Fig. H)

Location: Lat. 51°47–49′ Long. 120°24–27′ (92P/16W)
At approximately 4,000 feet elevation, by Sicily Lake.
Claims: Twenty-five CS.
Access: By road from Clearwater, 25 miles.
Owner: CANADIAN SUPERIOR EXPLORATION LIMITED, 5, 465 Victoria Street, Kamloops.
Metal: Molybdenum.
Description: Molybdenite in quartz fractures in granodiorite.
Work done: Magnetometer survey, 20 line-miles.
Reference: Assessment Report 2571.

WET, SUN, AKU (No. 161, Fig. H)

By V. A. G. Preto

Location: Lat. 51°46′ Long. 120°20′ (92P/16W)
At elevation 5,400 feet on a ridge 8,000 feet east of Patricia Lake, 15 miles northwest of Clearwater.
Claims: Eight WET, 10 SUN, 25 AKU.
Access: From Clearwater via main Clearwater Timber Products logging-road on Mann Creek north of Coldscaur Lake and thence by 4 miles of access road.
Owner: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.
Metal: Molybdenum.
Description:

The main molybdenite showings covered by these claim groups are located at elevation 5,400 feet on a ridge 8,000 feet east of Patricia Lake, 15 miles northwest of Clearwater. They were discovered in 1967 as the result of a stream sediment geochemical survey carried out in 1966.

The showings are entirely in granitic rocks of the Raft Batholith, and occur in a unit of medium-grained, leucocratic biotite-quartz monzonite which is surrounded by more mafic biotite-quartz monzonite that grades to the southwest into biotite-hornblende granodiorite (*see* Fig. 42). The contact between the biotite-quartz monzonite and the leucocratic quartz monzonite is fairly sharp, but it is not known whether or not it is intrusive. Both quartz monzonite phases are cut by dykes of quartz-feldspar porphyry which trend east-west to north-northwest. The granitic and dyke rocks are all cut by aplite veins and dykes, which are cut by molybdenite-bearing quartz veins, which are, in turn, cut and offset by pyrite-quartz veins. The main molybdenite showings are confined to a fracture zone that trends east-southeast and dips at 55 degrees to the north (*see* Fig. 42). Mineralized fractures and quartz veins within this zone average 2.5 per foot in trenches and from 2 to 4 per foot in drill holes. Outside the main zone, fractures are so much more widely spaced to be of no direct economic interest. The difference in the orientation of fractures within and outside the main zone of mineralization is illustrated by the two equal area plots on Figure 42. Within the mineralized zone the fractures show a strong concentration with a maximum at 108/55 N. Outside the main zone the fractures are steeply dipping and much more randomly oriented. Molybdenite occurs exclusively in quartz veins which range from hairline to three-quarters of an inch thick, and may or may not have associated pyrite. Secondary minerals commonly found on the surface are ferrimolybdite, limonite, and manganese oxides. No other metallic minerals were noted. Rock alteration even within the main mineralized zone is very weak and limited to saussurite alteration of feldspars. No indication was found of the presence or proximity of zones or pipes of breccia which might form a better site for molybdenum mineralization. Though limited exposures and lack of marker horizons make it difficult to map faults, air photographs of the area show very prominent sets of northerly and east-west trending linears of regional extent. Some of these linears undoubtedly represent faults or breaks through the area.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 131; 1968, p. 166; Assessment Report 1026.

LITTLE FORT

SO, RL (No. 162, Fig. H)

LOCATION: Lat. 51°37′ Long. 120°31.2′ (92P/10E)
Three and one-half miles northwest of Friendly Lake.

CLAIMS: SO, RL, totalling approximately 50.

ACCESS: From Bridge Lake by 20 miles of dirt road.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METALS: Copper, silver, lead.

WORK DONE: Geological mapping, 1 inch equals 200 feet, and bulldozer trenching on SO 2, 4, 7, 19, 38, and 44.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 133; 1968, p. 167.

RO, TC (No. 163, Fig. H)

LOCATION: Lat. 51°35.5′ Long. 120°27.3′ (92P/9W)
Immediately north of Friendly Lake.

CLAIMS: RO, TC, totalling approximately 70.

ACCESS: From Bridge Lake by 16 miles of dirt road.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METALS: Copper, lead, silver.

WORK DONE: Geological mapping, 1 inch equals 200 feet, and bulldozer trenching on RO 5, 7, and 76.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 133; 1968, p. 167.

ANTICLIMAX (MO) (No. 164, Fig. H)

By V. A. G. Preto

LOCATION: Lat. 51°36′ Long. 120°18′ (92P/9W)
Twelve miles northwest of Little Fort and approximately one-half mile northeast of the north end of Tintlhohtan Lake.

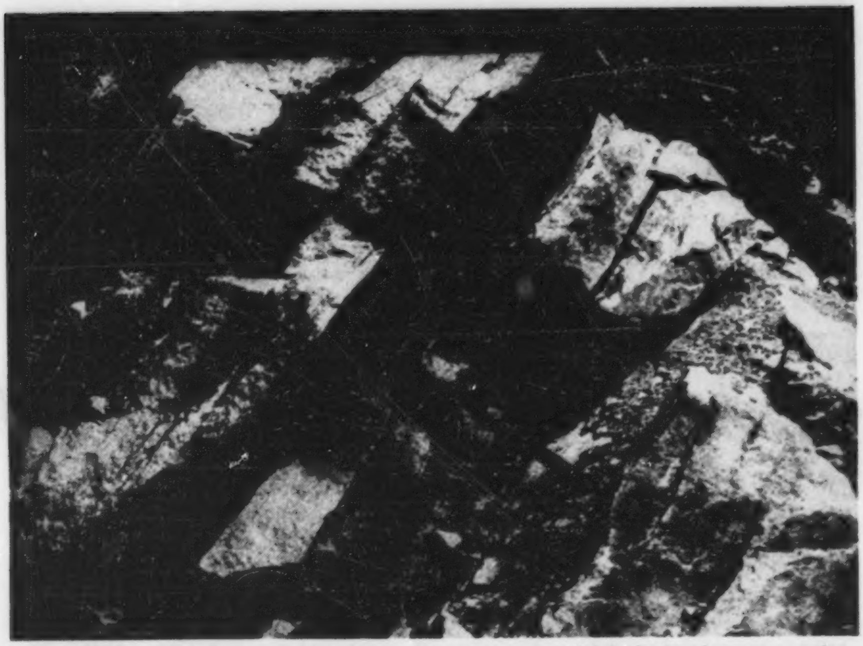


Plate XIVA.—Wet, Sun, and Aku claims. Fractures and molybdenite-bearing quartz veins in biotite quartz monzonite. Trench No. 2 looking east.

Plate XIVB.—Anticlimax prospect. Fracturing in aplite and quartz feldspar porphyry. Open cut northwest of Rong Lake. Looking east.

CLAIMS: Forty claims total, approximately 30 of which are MO group.

ACCESS: From Little Fort by 17 miles of dirt road via Lemieux and Fourteen Mile Creeks.

OWNERS: **GUNG LOY JIM and K. CALDER.**

METAL: Molybdenum.

DESCRIPTION:

High-grade molybdenum float was first discovered in 1938 and sporadic work has been done on the property since then. Since 1960, several mining companies have taken options on the property and expended a good deal of effort in geological, geophysical, and geochemical surveys, trenching, and some diamond drilling. The most recent work was done in 1969 by Falconbridge Nickel Mines Limited. It included soil and stream geochemical surveys over the entire property and its vicinities, electromagnetic and magnetic surveys over part of the property, and nine diamond-drill holes totalling 3,233 feet. In addition, the geology of the property was mapped at a scale of 1 inch equals 200 feet. The map accompanying the present report is a generalized and modified version of the recent Falconbridge map.

Molybdenite mineralization is found in a small granite stock elongated in a northwesterly direction. The stock is approximately 5,000 feet long and 3,000 feet wide and is surrounded by sedimentary and volcanic rocks which on Geological Survey of Canada Map 3-1963 are mapped as Lower and Middle(?) Jurassic. A few exposures of similar granite found northwest of the main body, if connected with it, would extend its length to approximately 8,000 feet. The contact of the stock was not observed by the writer, but is assumed to be sharp because exposures of granite along Rong Creek (*see* Fig. 43) are found very close to exposures of hornfels derived from sedimentary and volcanic rocks.

The main exposures of intrusive rocks are found at and near the top of a low, sparsely forested hill north of Rong Lake (*see* Fig. 43) and in an area of stripping and trenching east of this lake. As shown on Figure 43, the main part of the stock is composed of medium-grained leucocratic granite and porphyritic granite which in thin-section appears to be composed essentially of subequal amounts of quartz, microperthite, and albite-oligoclase with traces of muscovite and, occasionally, light-brown biotite. North of Rong Lake and near the centre of the main intrusive body is a poorly defined area, probably some 3,000 feet long and 1,500 feet wide, which is underlain by a complex mixture of aplite, quartz-feldspar pegmatite, and quartz-feldspar porphyry. The relationships between these rocks are only poorly known, but for the most part appear to be gradational. Though small dykes of similar rocks are found cutting the granite phase, it is not clear whether the main body of the aplite-pegmatite-porphry phase is a later plug within the granite. Where exposures are best, it appears, however, that this phase is gradational with the granite phase over a distance of a few feet. Rocks of the aplite-pegmatite-porphyry phase are generally very fresh and unaltered. Kaolinization of the feldspars is more common and widespread in the granite phase, and at some localities the granite has been reduced to a light-grey, nearly white, crumbly rock in which the plagioclase feldspar has been entirely converted to kaolinite.

Fracturing and the development of quartz veinlets are common and widespread in all phases of the stock. Figure 43 is a synoptic diagram of fractures, quartz veins, and mineralized veins as measured at several localities within the main body of the stock. It represents a clearly preferred orientation of steeply dipping fractures trending in a north-northeasterly direction, somewhat parallel to the long axis of the stock. A conclusive genetic interpretation of the pattern shown in this diagram is not attempted because of the poor and uneven exposure of the pluton, and because of the inability to distinguish primary from later structures.

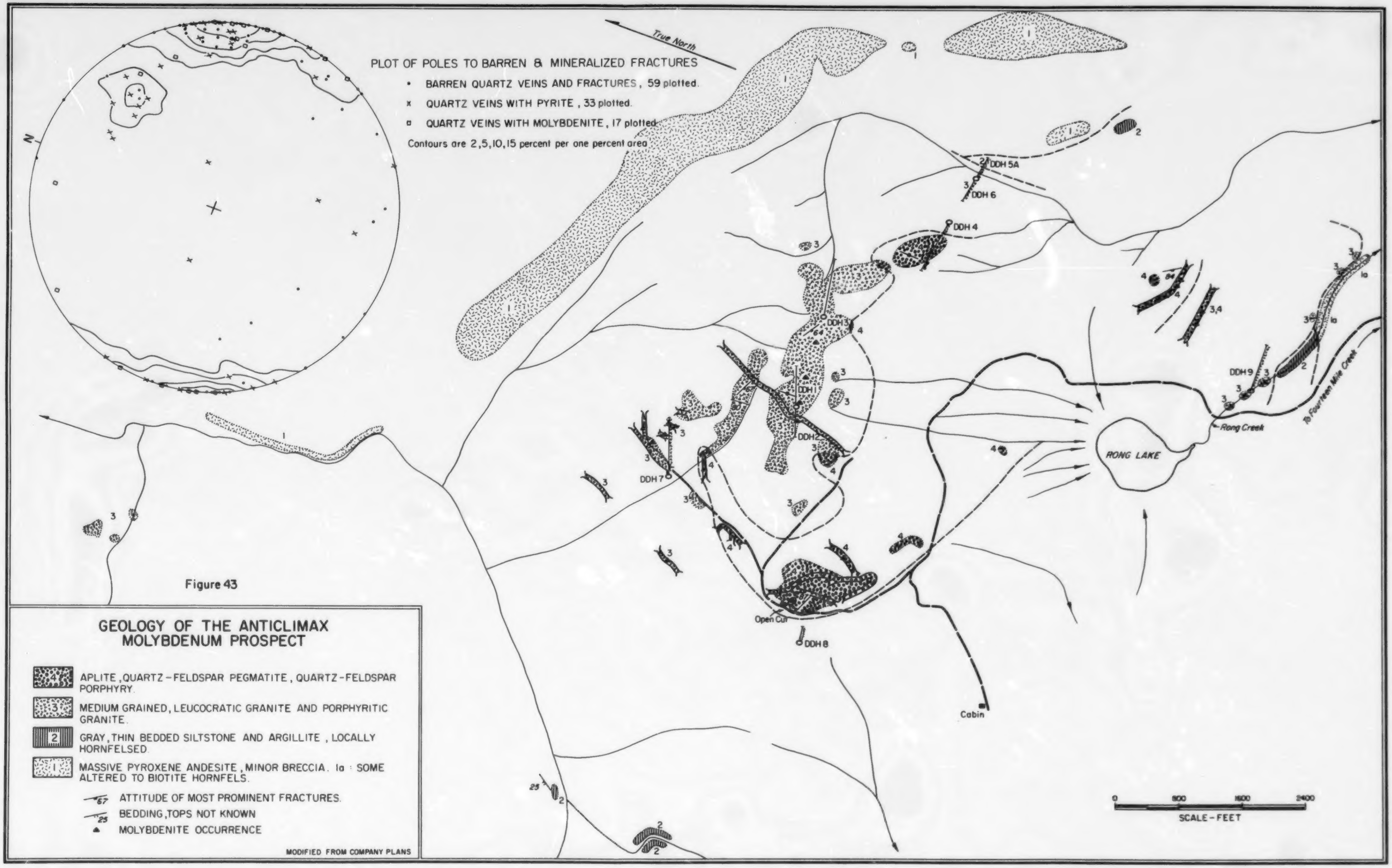


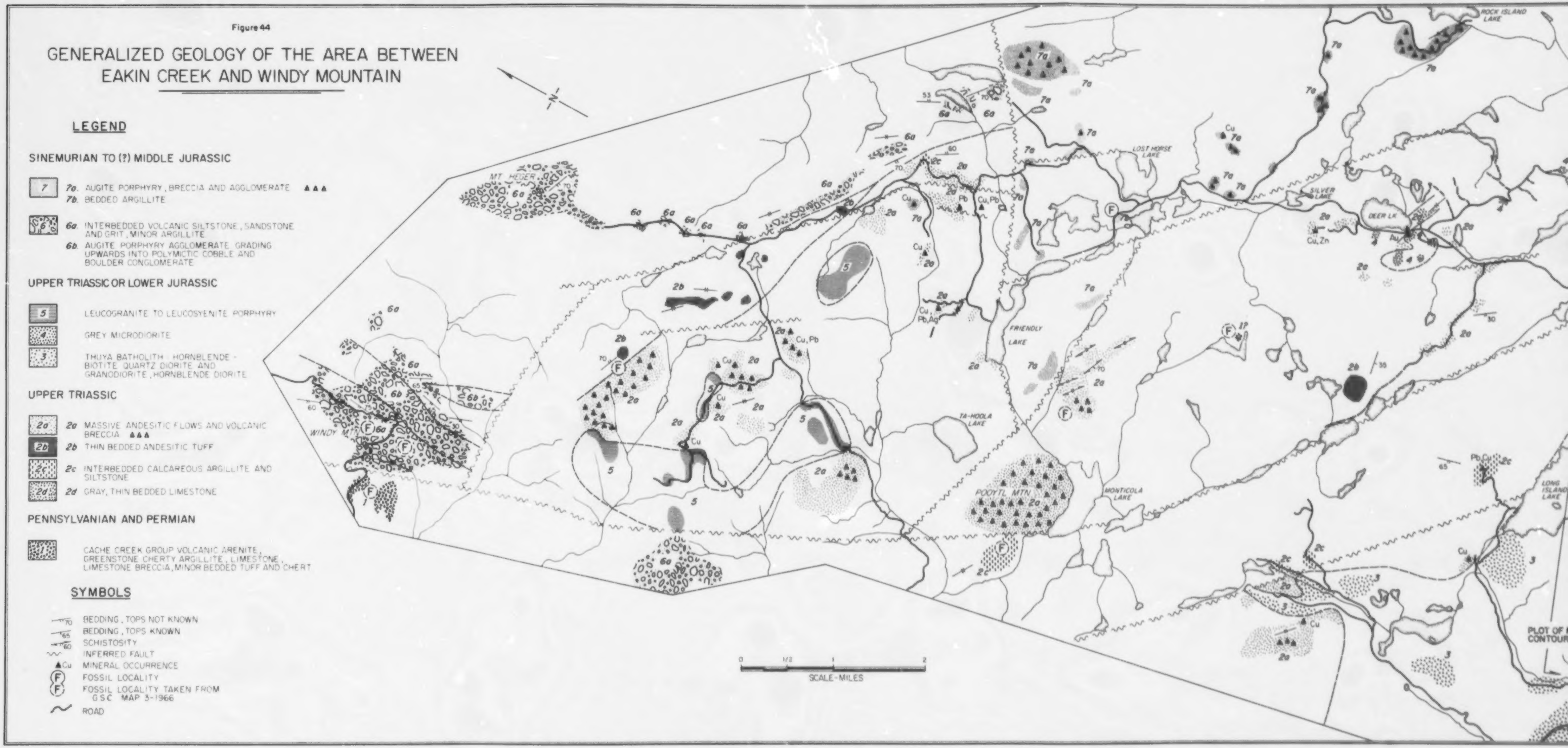
Figure 43

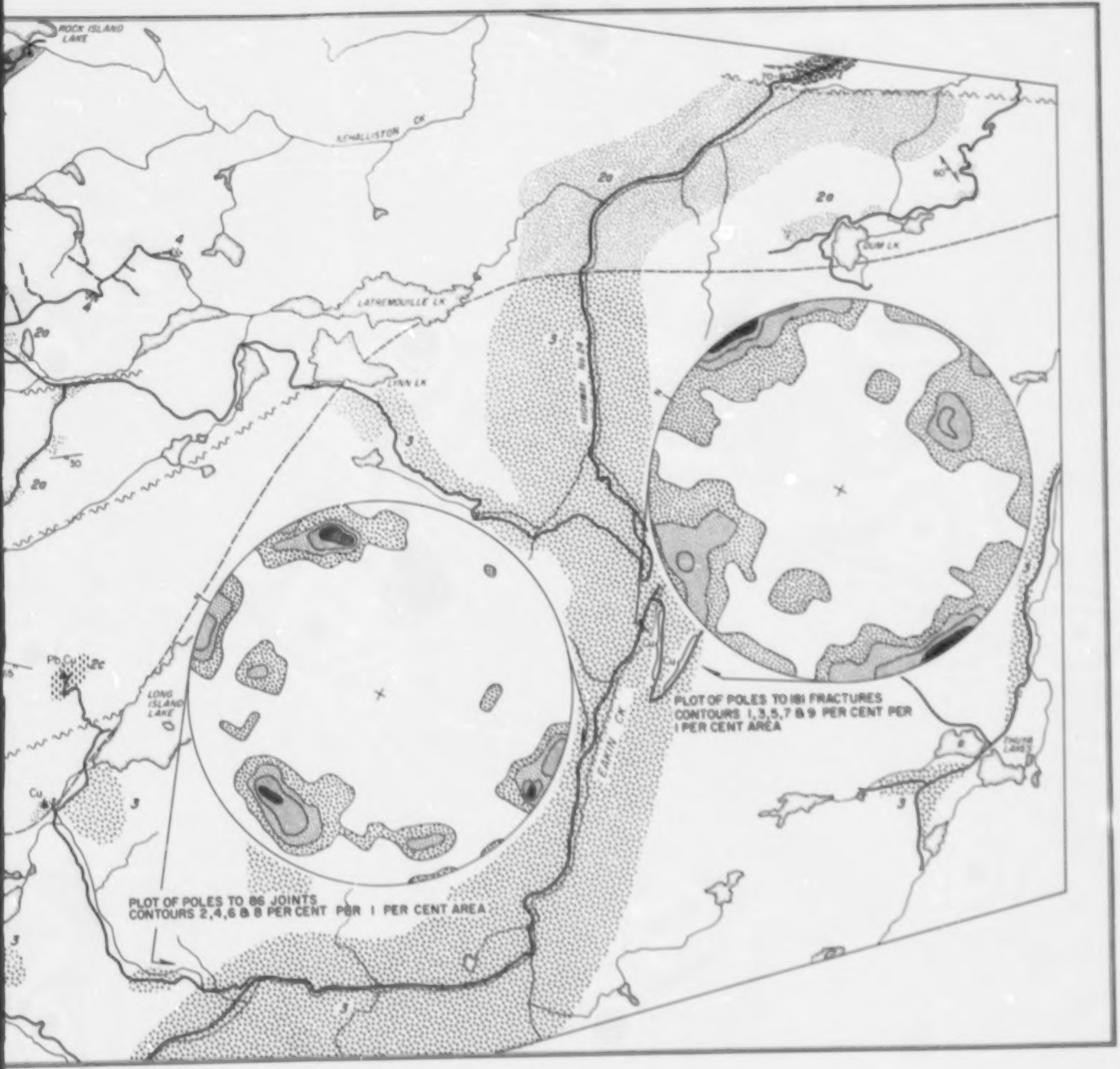
GEOLOGY OF THE ANTICLIMAX MOLYBDENUM PROSPECT

4 ▨ APLITE, QUARTZ-FELDSPAR PEGMATITE, QUARTZ-FELDSPAR PORPHYRY.
3 ▨ MEDIUM GRAINED, LEUCOCRATIC GRANITE AND PORPHYRITIC GRANITE.
2 ▥ GRAY, THIN BEDDED SILTSTONE AND ARGILLITE, LOCALLY HORNFELSED.
1 ▨ MASSIVE PYROXENE ANDESITE, MINOR BRECCIA. Ia : SOME ALTERED TO BIOTITE HORNFELS.
67 ATTITUDE OF MOST PROMINENT FRACTURES.
25 BEDDING, TOPS NOT KNOWN
▲ MOLYBDENITE OCCURRENCE
MODIFIED FROM COMPANY PLANS
PLOT OF POLES TO BARREN & MINERALIZED FRACTURES
• BARREN QUARTZ VEINS AND FRACTURES, 59 plotted.
× QUARTZ VEINS WITH PYRITE, 33 plotted.
▫ QUARTZ VEINS WITH MOLYBDENITE, 17 plotted.
Contours are 2,5,10,15 percent per one percent area
N
True North
DDH 5A
DDH 6
DDH 4
DDH 3
DDH 1
DDH 2
DDH 7
DDH 8
DDH 9
Open Cut
Cabin
RONG LAKE
Rong Creek
To Fourteen Mile Creek
0
800
1600
2400
SCALE-FEET

Figure 44

GENERALIZED GEOLOGY OF THE AREA BETWEEN EAKIN CREEK AND WINDY MOUNTAIN


N
LEGEND
SINEMURIAN TO (?) MIDDLE JURASSIC
7 7a. AUGITE PORPHYRY, BRECCIA AND AGGLOMERATE ▲▲▲
7b. BEDDED ARGILLITE
6 6a. INTERBEDDED VOLCANIC SILTSTONE, SANDSTONE AND GRIT, MINOR ARGILLITE
6b. AUGITE PORPHYRY AGGLOMERATE GRADING UPWARDS INTO POLYMICTIC COBBLE AND BOULDER CONGLOMERATE
UPPER TRIASSIC OR LOWER JURASSIC
5 LEUCOGRANITE TO LEUCOSYENITE PORPHYRY
4 GREY MICRODIORITE
3 THUYA BATHOLITH : HORNBLENDE - BIOTITE QUARTZ DIORITE AND GRANODIORITE, HORNBLENDE DIORITE
UPPER TRIASSIC
2a 2a MASSIVE ANDESITIC FLOWS AND VOLCANIC BRECCIA ▲▲▲
2b 2b THIN BEDDED ANDESITIC TUFF
2c 2c INTERBEDDED CALCAREOUS ARGILLITE AND SILTSTONE
2d 2d GRAY, THIN BEDDED LIMESTONE
PENNSYLVANIAN AND PERMIAN
1 CACHE CREEK GROUP VOLCANIC ARENITE, GREENSTONE CHERTY ARGILLITE, LIMESTONE, LIMESTONE BRECCIA, MINOR BEDDED TUFF AND CHERT
SYMBOLS
70 BEDDING, TOPS NOT KNOWN
65 BEDDING, TOPS KNOWN
60 SCHISTOSITY
INFERRED FAULT
▲Cu MINERAL OCCURRENCE
(F) FOSSIL LOCALITY
(F) FOSSIL LOCALITY TAKEN FROM GSC MAP 3-1966
ROAD
0 1/2 1 2
SCALE-MILES
MT. HEGER
WINDY MT.
ROCK ISLAND LAKE
LOST HORSE LAKE
SILVER LAKE
DEER LK
FRIENDLY LAKE
TA-HOOLA LAKE
POOYTL MTN
MONTICOLA LAKE
LONG ISLAND LAKE
PLOT OF
CONTOUR
Cu
Pb
Cu, Pb
Cu, Zn
Cu, Pb, Ag
Au
Pb, Cu


PLOT OF POLES TO 86 JOINTS
CONTOURS 2,4,6 & 8 PER CENT PER 1 PER CENT AREA

PLOT OF POLES TO 181 FRACTURES
CONTOURS 1,3,5,7 & 9 PER CENT PER 1 PER CENT AREA

ROCK ISLAND LAKE
SCHALLISTON CK
LATREMOUILLE LK
LYNN LK
DUM LK
HIGHWAY No 24
EAKIN CK
LONG ISLAND LAKE
THUYA LAKES
2a
2a
2a
2a
2a
2c
3
3
3
3
3
3
4
4
30
60
Pb,Cu
Cu
Cu
Cu

Mineralization in both intrusive phases is widespread, but erratic and sporadic. It consists of pyrite, molybdenite, bismuthinite, pyrrhotite, wolframite, and fluorite. Limonite and ferrimolybdite are common secondary minerals. Molybdenite mineralization is found in thin to hairline quartz veinlets with some pyrite. Larger quartz veins, one-half in 2 inches thick, usually contain pyrite which may be accompanied by molybdenite, wolframite, bismuthinite, and fluorite. In a few places, narrow zones of finely disseminated molybdenite alongside mineralized quartz veinlets in granite are found, but appear to be of very limited extent and erratic distribution. The original discovery showing, and the highest grade occurrence of molybdenite, is found in the open cut approximately 2,400 feet northwest of Rong Lake and is associated with a flat-lying pod of coarse-grained quartz feldspar pegmatite in a zone of strong west-northwest fracturing in the aplite-pegmatite-porphyry phase (*see* Fig. 43 and Plate XIVB). Apart from the high grade but small occurrence at this locality, all molybdenum mineralization found on the property to date, both on surface and in drill holes, has been sporadic and well below economic grade.

Though the stock appears to be located in an area of strong northwest and northeast trending faults (*see Geol. Surv., Canada,* Map 3-1963), and its emplacement may have been in part controlled by some of these structures, and although the acidic nature and apparent high-level emplacement of the stock are factors generally considered to be favourable to molybdenum mineralization, no indications of a significant deposit have been found to date. These attractive features appear to be offset by the lack of late intrusive phases such as a breccia pipe or a system of dykes which in many known cases have provided suitable conditions for the formation of an economic mineral deposit. Similarly, though fracturing and quartz veining are widespread and locally strong within the stock, no zone has to date been found where fracturing and veining are sufficently intense and extensive to provide a suitable structural control for a molybdenum orebody.

REFERENCES: *B.C. Dept. of Mines,* Bull. 9, 1940, pp. 20–28; *Minister of Mines, B.C.,* Ann. Rept., 1961, pp. 49–51; *Geol. Surv., Canada,* Map 3-1963; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 231.

GEOLOGY OF THE AREA BETWEEN EAKIN CREEK AND WINDY MOUNTAIN

By V. A. G. Preto

The area between Eakin Creek and Windy Mountain that is covered by Figure 44 is one of rolling upland in which swamps and small lakes abound and, except for a few sparse hilltops, rock exposures are scattered and poor. With a few exceptions, creek valleys are broad and covered by a considerable mantle of drift. The highest point in the area is Windy Mountain to the north, which reaches an elevation of 6,449 feet. To the south, the area is traversed from west to east by the deeply incised valley of Eakin Creek, which offers excellent and nearly continuous exposures of granitic rocks of Thuya Batholith and, to the east, of volcanic and sedimentary rocks of the Nicola and Cache Creek Groups.

The geology of the area is characterized by a mosaic of fault blocks of sedimentary and volcanic rocks that range in age from Permian to Lower Jurassic. To the south, these rocks are truncated by the northern part of Thuya Batholith and in the area between Friendly Lake and Windy Mountain they are intruded by stocks of fine-grained leucogranite to leucosyenite porphyry that may be satellites of Thuya Batholith. The geological framework of the area is outlined in Geological Survey of Canada Map 3-1966. The present writer devoted his time chiefly to examining several base metal prospects and their setting in the local geology.

MAP UNIT 1—CACHE CREEK GROUP

Rocks believed to be part of the Cache Creek Group are found at three localities within the map-area. On Eakin Creek, to the southeast, a sequence of cherty argillite and fine-grained, hard, calcareous argillite is shown on Geological Survey of Canada Map 3-1966 as being part of the Cache Creek Group. On the same map an occurrence of dark-grey to black coquinoid limestone 2 miles south of the east end of Friendly Lake is reported to have yielded Permian brachiopods. On Windy Mountain, a sequence of arenaceous sediments, bedded tuffs, and dark-grey limestone has also yielded Permian brachiopods and fusulinids. With the exception of the isolated locality south of Friendly Lake, the other areas of Cache Creek rocks are in fault contact with younger rocks of Upper Triassic and Jurassic age.

MAP UNIT 2—NICOLA GROUP

Rocks of the Nicola Group are the most common and widespread in the map-area, as well as the hosts to virtually all the known mineral occurrences. On the basis of their lithology, Nicola rocks have been divided into four subunits, a brief description of which is given below.

Subunit 2a—Massive andesite, pyroxene andesite, and breccia are common and widespread in the area. They are generally interlayered with one another on a large scale and may locally contain interbeds of light-green laminated tuff. Massive flow rocks are generally medium to fine grained, occasionally amygdaloidal, and usually contain tiny phenocrysts of augite and (or) plagioclase. Fragmental rocks range from breccias in which an andesitic matrix contains angular to subrounded clasts of a nearly identical rock, to breccias in which the clasts consist of a wide variety of rocks, both volcanic and sedimentary. One mile south of Friendly Lake, for instance, grey limestone fragments that have yielded an Upper Karnian fauna are common in a sequence of volcano-clastic rocks.

In the vicinity of intrusions, Nicola volcanic rocks have been altered in varying degree. On upper Phinetta Creek, within a few hundred feet of granitic rocks of Thuya Batholith, massive andesite, volcanic breccia and tuff have been changed to biotite and pyroxene hornfels that are locally laced with quartz-epidote-carbonate-garnet veinlets. One mile southeast of Dum Lake, similar rocks have been changed to fine-grained amphibolite schist. In the vicinity of the leucogranite and leucosyenite porphyry stocks northwest of Friendly Lake, massive and fragmental andesites have been extensively epidotized and, closer to the intrusions, are laced by veinlets of orthoclase, hedenbergite, antigorite, calcite, and chalcedony.

Subunit 2b — Thin-bedded, light-green tuff with some interbeds of coarser lapilli tuff and tuff breccia is found approximately halfway between Friendly Lake and Windy Mountain. Similar rocks are also found locally as interbeds with rocks of unit 2a. Rocks of unit 2b are of limited areal extent and probably grade laterally into rocks of unit 2a.

Subunit 2c—Interbedded calcareous siltstone, argillite, shale, and sandstone have been observed at three localities between Long Island Lake and Monticola Lake. They appear to make up a poorly exposed northwest-trending fault block and, in the vicinity of Monticola Lake, have yielded a Halobiid fauna of probable Upper Triassic age.

Subunit 2d—Grey, fine-grained, well-bedded limestone, locally altered to skarn, is found in exploration trenches at the south end of Deer Lake. Boulders of the same rock found in the vicinity show tight folding, brecciation, and some quartz veining.

MAP UNIT 3

Biotite-hornblende granodiorite and quartz diorite of Thuya Batholith occupy the whole southern part of the map-area where they are in contact with sedimentary and volcanic rocks of the Nicola Group. The best and most continuous exposures are found along the deeply incised valley of Eakin Creek. The contact relationships of rocks of Thuya Batholith with the surrounding Nicola rocks vary. West of Long Island Lake and on upper Phinetta Creek the contacts appear to be sharp and the surrounding volcanic rocks have been altered to hornfels. In the vicinity of Dum Lake to the southeast, Nicola rocks have been locally intensely deformed and changed to amphibolite schist. The intrusive contact in this area is not clearly defined and appears to occupy a relatively wide transition zone.

From field relationships and from a very limited amount of potassium-argon age determinations, the age of Thuya Batholith is considered to be very Late Triassic or very Early Jurassic (Campbell, R. B., and Tipper, H. W., unpublished manuscript).

MAP UNIT 4

Grey, medium-grained diorite is found at several localities near and southeast of Deer Lake. Because of poor and very sparse exposures, nothing is known on the mode of occurrence of this unit other than it is intrusive into and locally causes considerable development of skarn and some sulphide mineralization in rocks of units 2a and 2d. The diorite is probably part of a satellitic body of Thuya Batholith.

MAP UNIT 5

Medium-grained leucogranite to leucosyenite porphyry occurs as three distinct stocks, roughly halfway between Friendly Lake and Windy Mountain. The largest of these stocks is approximately 3 miles long and three-quarters of a mile wide, elongated in a northwesterly direction and crudely crescentic-shaped. The other two stocks lie east of it and are of much smaller size. A number of dykes of similar composition radiate from these stocks into the surrounding volcanic rocks.

A considerable range in composition was observed in the three stocks, particularly with regard to the quartz content. Two thin-sections from the northern part of the larger stock indicate that there the rock is a leucogranite porphyry, composed essentially of euhedral to subhedral orthoclase phenocrysts, a subordinate amount of oligoclase, and 15 to 30 per cent anhedral interstitial quartz grains. One thin-section from the smallest stock indicates the rock is a fine-grained syenite porphyry made up of large phenocrysts of perthitic potash feldspar surrounded by a granular aggregate of smaller grains of sodic plagioclase and some quartz. The easternmost stock is composed of leucogranite porphyry consisting almost entirely of perthite and interstitial quartz, and laced by a very large number of quartz veinlets. In the vicinity of the larger stock in particular, both volcanic and intrusive rocks are cut by numerous veins of hedenbergite, orthoclase, calcite, antigorite, and, in some cases, chalcedony. Chalcopyrite, pyrite, galena, and tetrahedrite are found at several localities in altered volcanic and, occasionally, in intrusive rocks.

The age of these leucocratic intrusions is not clearly known. They cut Upper Triassic Nicola rocks and, on Windy Mountain, boulders of similar rocks are found in conglomerate of the Lower Jurassic map unit 6b (Campbell, R. B., and Tipper, W. H., unpublished manuscript). The intrusions are therefore probably of the same age as the Thuya Batholith and may be satellites of it.

MAP UNIT 6

Subunit 6a—Interbedded grey and dark-grey volcanic siltstone, sandstone, and grit are found in the northeastern corner of the map-area in the vicinity of Mount Heger, on Windy Mountain, and on an isolated hill west of the largest leucogranite stock of unit 5. Where best exposed, on Windy Mountain and on Mount Heger, these rocks are generally well and thinly bedded. In hand specimen they have the appearance of normal clastic sediments, but in thin-section they can clearly be seen to be composed of tiny fragments of augite, plagioclase, and, in the coarser phases, fine-grained volcanic rocks. On Windy Mountain these rocks have yielded ammonites of probably Sinemurian age (*Geol. Surv., Canada*, Map 3-1966; Campbell, R. B., and Tipper, H. W., unpublished manuscript, p. 66).

Subunit 6b—A prominent unit of augite porphyry agglomerate and polymictic volcanic conglomerate more than 1,000 feet thick is found on Windy Mountain interbedded with finer-grained clastic rocks of unit 6a. The lower part of this unit is composed entirely of subrounded blocks of augite andesite set in a matrix of more finely broken material of the same composition. This rock grades upward into a cobble and boulder conglomerate in which generally well-rounded clasts of augite porphyry are found, together with a variety of other rocks which include hornblende-biotite granodiorite, trachyte porphyry, grey limestone, and dark-grey argillite. A short distance to the east and lower in the section a similar unit of augite porphyry agglomerate is found on both sides of Windy Creek. This unit appears to lack the portion of polymictic conglomerate and thins very quickly to the north into fine-grained rocks of unit 6a.

MAP UNIT 7

Subunit 7a—A striking sequence of coarse-grained augite porphyry breccia and agglomerate with some fine-grained crudely foliated amygdaloidal augite porphyry and more massive augite porphyry is found in the east central part of the map-area between the east end of Friendly Lake and Rock Island Lake. The coarse fragmental phase of this unit is more prominent 7,000 feet north of Lost Horse Lake, where it forms a bold rocky hill, and in the vicinity of Rock Island Lake. Massive augite porphyry, in part probably intrusive, is found between Lost Horse Lake and Friendly Lake. Crudely foliated amygdaloidal augite porphyry with a few traces of chalcopyrite was observed in an exploration trench on a hilltop 5,000 feet southeast of Lost Horse Lake.

Subunit 7b—One exposure of fossiliferous-bedded argillite probably associated with rocks of unit 7a was found in an exploration trench 1,000 feet west of the west end of Lost Horse Lake. Poorly preserved ammonoids collected by the writer from these rocks suggest a Late Sinemurian or Early Pleinsbachian age.

Mineral Occurrences

Numerous base-metal showings and prospects are found in the map-area and can be subdivided in three groups. Copper and, to a lesser extent, gold, lead, and silver are found in skarns in the vicinity of stocks of map unit 5, near diorite of map unit 4, and at certain localities near the edge of Thuya Batholith. Occurrences of lead and silver with smaller copper values are found along shear zones in intensely altered volcanic rocks. Copper in quartz stockwork occurrences is found in granitic rocks of Thuya Batholith.

The showings that belong to these three main groups can be described briefly as follows:

1. *Skarn deposits near Deer Lake*—Several occurrences of sulphide mineralization are found in the vicinity of Deer Lake in volcanic rocks and limestone that locally have been altered to skarn. Values in copper and gold have been reported. Mineralization includes massive pyrrhotite and magnetite as well as pyrite and chalcopyrite. Three selected samples of massive pyrrhotite-magnetite mineralization taken at some old workings at the southwest end of Deer Lake gave the following results:

Sample No.	Gold (Oz. per Ton)	Silver (Oz. per Ton)	Copper (Per Cent)
1	Trace	Trace	0.14
2	0.02	Trace	0.40
3	0.19	0.30	0.75

The mineralization and related skarn alteration are closely related in distribution to bodies of grey microdiorite (map unit 4). A considerable amount of trenching and some diamond drilling has been done on a narrow strip of ground extending for nearly 2 miles southeast from Deer Lake. No drill core could be obtained for examination and the few sparse exposures that could be found indicate that the microdiorite extends at least as far southeast as exploratory work was done, and that altered and weakly mineralized volcanic rocks can be found locally in this belt.

2. *Lead-silver mineralization north of Friendly Lake*—Approximately 3,000 feet north of Friendly Lake, in an area of virtually no outcrop, trenching and diamond drilling have outlined a zone of argentiferous galena mineralization that is reported to occur within a shear zone that strikes north 60 degrees west and dips 65 degrees to the southwest (Ann. Rept., 1968, p. 168). The mineralization occurs as disseminated galena, pyrite, and some chalcopyrite in andesite and fragmental andesite that are strongly altered to bluish antigorite, pyroxene, chlorite, and calcite. Some 7,000 feet northeast of Friendly Lake a similar type of mineralization and alteration is found, again in massive and fragmental andesite.

3. *Copper mineralization associated with the leucogranite and leucosyenite porphyry stocks*—Approximately 3 miles northwest of Friendly Lake and immediately east of the largest stock of unit 5, several occurrences of chalcopyrite, pyrite, galena, and some tetrahedrite have been found both in altered volcanic and intrusive rocks. Alteration associated with the intrusions is widespread and locally intense, and consists of pronounced fracturing of the volcanic rocks, accompanied by pervasive development of pyroxene, epidote, and chlorite, as well as by orthoclase-hedenbergite veining and by local development of antigorite and chalcedony. Sulphides are found either along fractures or disseminated throughout the altered rocks.

4. *Copper occurrences on Phinetta Creek and northwest of Long Island Lake*—Massive and fragmental andesite and tuff are commonly altered to biotite or pyroxene hornfels close to the contact of Thuya Batholith between Long Island Lake and Upper Phinetta Creek. Locally light-grey veinlets of epidote, quartz, carbonate, and garnet lace the hornfels. A considerable amount of trenching as well as some diamond drilling has been done in this area, but nothing of interest other than some sparsely disseminated pyrrhotite, pyrite, and traces of chalcopyrite has been found in the hornfels.

5. *Lead and copper occurrences north of Long Island Lake*—Mineralization consisting of much pyrrhotite, pyrite, galena, and some chalcopyrite is found on a hilltop approximately 3,000 feet north of the north shore of Long Island Lake. The sulphides occur as small lenses in a 50 to 60-foot-wide zone of skarny alteration

that parallels the bedding in dark-grey calcareous shale and siltstone of map unit 2c, and is paralleled to the east by a 30 to 35-foot-wide sill of rusty weathering quartz feldspar porphyry that is thoroughly sericitized and weakly mineralized.

6. *Copper occurrences north of Thuya Lakes*—Sparse occurrences of chalcopyrite were observed in strongly fractured and saussuritized granodiorite of Thuya Batholith along the new Thuya Lakes logging-road directly south of Eakin Creek. Chalcopyrite occurs in leached quartz veinlets that cut the granodiorite and contain a good deal of deep chocolate-brown limonite. Mineralization can be found, though very weak and sporadic, in most road cuts along the first 2 miles of road on the south side of Eakin Creek. Similar alteration and traces of chalcopyrite were observed in much the same granitic rock in a small isolated exposure surrounded by overburden along the same road 8,500 feet south of Eakin Creek.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1968, pp. 167, 168; *Geol. Surv., Canada,* Map 3-1966; Campbell, R. B., and Tipper, H. W., Bonaparte River Map-Area, British Columbia (92P), unpublished manuscript.

SILVER (No. 165, Fig. H)

LOCATION: Lat. 51°32–34′ Long. 120°21–25′ (92P/9W)
Between 4,500 and 4,800 feet elevation, near Deer Lake, 12 miles northwest of Little Fort.

CLAIMS: SILVER 1 to 28, 39 to 44, 109 to 112; MAY 1 to 4; SP 1 to 6; BILL 1, 3, 4; BILL 2 Fraction; UNITED 1 to 8, UNITED 9 and 10 Fractions.

ACCESS: From Highway 24, 9.5 miles west of Little Fort, by 6 miles of logging-road northward.

OWNER: UNITED COPPER CORPORATION LIMITED, 1800, One Bentall Centre, Vancouver 1.

METALS: Copper, silver, gold.

DESCRIPTION: Magnetite, pyrrhotite, pyrite, and chalcopyrite occur in zones of skarn derived from massive and fragmental volcanic rocks of the Upper Triassic Nicola Group, near bodies of greenish-grey pyroxene microdiorite that are probably satellites of the Upper Triassic or Lower Jurassic Thuya Batholith.

WORK DONE: Surface workings mapped; magnetometer survey, 3.45 line-miles covering United 2 to 5 (in part).

REFERENCES: *Minister of Mines, B.C.* Ann. Repts., 1967, p. 133; 1968, p. 166; *Geol. Surv., Canada,* Map 3-1966; Assessment Reports 981, 1061, 1169, 1690, 2712 (United 2 to 5 only).

PC (No. 166, Fig. H)

LOCATION: Lat. 51°31′ Long. 120°30′ (92P/9W)
At approximately 4,000 feet elevation, on Phinetta Creek, approximately 14 miles northwest of Little Fort and 2.5 miles north of Phinetta Lake.

CLAIMS: PC, totalling 16.

ACCESS: From Little Fort by road, 22 miles.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METAL: Copper.

WORK DONE: Five bulldozer trenches totalling 490 feet.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 133; 1968, p. 168; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 231, Assessment Reports 1193, 1750, 2210.

KEY (No. 167, Fig. H)

Location: Lat. 51°27′ Long. 120°22′ (92P/8W)
Between 2,500 and 3,600 feet elevation, 8 miles west-northwest of Little Fort, on Emar Creek.

Claims: KEY 1 to 40.

Access: By road from Highway 5 at Little Fort, 12 miles west on Highway 24.

Owner: GRANITE MOUNTAIN MINES LTD., 330, 470 Granville Street, Vancouver 2.

Description: The claims occupy an area underlain by and close to the northern edge of the Upper Triassic Thuya Batholith. No specific information has been obtained regarding the nature and extent of the mineralization, if any is exposed.

Work done: Induced polarization survey, approximately 14 line-miles.

HIDDEN CREEK, CANYON (No. 168, Fig. H)

Location: Lat. 51°27.8′ Long. 120°16.4′ (92P/8W)
At approximately 3,000 feet elevation, 3⅓ miles northwest of Little Fort.

Claims: HIDDEN CREEK, CANYON.

Access: By road from Little Fort, 7 miles.

Owner: HOWARD HANSEN, Little Fort.

Metals: Gold, silver, copper.

Description: Gold, silver, and copper values in granitic rocks of the Thuya Batholith.

Work done: Trenching, 50 feet on Hidden Creek.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 168; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 232.

BARRIERE

L, K (No. 169, Fig. H)

Location: Lat. 51°19′ Long. 120°03–08′ (92P/8E)
At approximately 4,500 feet elevation, on Newhykulston Creek, 10 miles north of Barriere and 3 miles east of North Thompson River.

Claims: L 1 to 46; K 1 to 32.

Access: By road from Kamloops, 63 miles.

Owner: Kel-Glen Mines Ltd.

Operator: RIO TINTO CANADIAN EXPLORATION LIMITED, 615, 555 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Pyrite, chalcopyrite, and magnetite are found in altered sedimentary rocks of the Fennell Formation.

Work done: Surface geological mapping, 1 inch equals 20 feet on K 13 and 14; self-potential survey, 3.26 line-miles covering K 11 to 14; magnetometer survey, 3.48 line-miles covering K 11 to 14; geochemical soil survey, approximately 350 samples covering K 3 to 20; surface diamond drilling, three holes totalling 1,502 feet on K 11 and 13.

GOODLUCK, HARPER, ULTIMA (No. 182, Fig. H)

Location: Lat. 51°19–21′ Long. 119°50–54′ (82M/5W)
At approximately 6,000 feet elevation, on the north shore of North Barriere Lake.

CLAIMS: GOODLUCK, GOODLUCK 1 to 3, HARPER 1 to 9, ULTIMA 1 to 11, ULTIMA EAST 1 to 8, CREEK 1 to 4, CREEK 1 Fraction.

ACCESS: By road from Barriere, approximately 28 miles.

OWNER: BARRIERE LAKE MINERALS LTD., 539 Eighth Avenue SW., Calgary 2, Alta.

METALS: Nickel, copper, zinc, silver.

DESCRIPTION: Mineralization is found in silicified zones roughly parallel to the foliation of metasedimentary rocks near the contact with granitic rocks of the Baldy Batholith of Cretaceous age.

WORK DONE: Surface diamond drilling, five holes totalling 648 feet on the Goodluck 1, Ultima 2 and 5, and Harper 7 claims.

NB (No. 181, Fig. H)

LOCATION: Lat. 51°21′ Long. 119°46–50′ (82M/5W)
At approximately 2,500 feet elevation, at east end of North Barriere Lake.

CLAIMS: NB 1 to 46.

ACCESS: By road from Barriere, 20 miles.

OWNER: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

DESCRIPTION: The property is located on the southwestern contact of the Upper Cretaceous Baldy Batholith. No economically interesting mineralization was uncovered.

WORK DONE: Magnetometer survey, 15 line-miles; electromagnetic survey, 15 line-miles; geochemical soil survey, 400 samples covering NB 15 to 26 and 33 to 40 claims.

REFERENCE: Assessment Report 2627.

B&B (No. 180, Fig. H)

LOCATION: Lat. 51°19–20′ Long. 119°47–50′ (82M/5W)
At approximately 2,500 feet elevation on southeast shore of North Barriere Lake.

CLAIMS: Twenty-six B&B and NLSS claims.

ACCESS: By road and boat from Barriere, 20 miles.

OWNER: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

METAL: Copper.

DESCRIPTION: Chalcopyrite, pyrite, and pyrrhotite are found at several localities along the lakeshore in chlorite schist and grey gneiss, immediately southwest of the contact of the Upper Cretaceous Baldy Batholith.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 11 line-miles; geochemical soil survey, 280 samples on all claims.

REFERENCE: Assessment Report 2679.

EBL (No. 179, Fig. H)

LOCATION: Lat. 51°17–21′ Long. 119°45–49′ (82M/5W)
At approximately 3,900 feet elevation, between the east ends of North and East Barriere Lakes.

CLAIMS: EBL, REM, BRAD, SNARK Fractions, 119 in all.

ACCESS: By road from Barriere, 25 miles.

OWNER: Royal Canadian Ventures Ltd.

Operator: RAYROCK MINES LIMITED, 1011, 2200 Yonge Street, Toronto, Ont.

Metal: Copper.

Description: The property is located along the southwestern contact of the Upper Cretaceous Baldy Batholith. Pyrrhotite, chalcopyrite, and magnetite are found in areas of amphibolite garnet skarn along and near the contact.

Work done: Surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 26 line-miles; geochemical soil survey, 441 samples covering EBL, Rem, and Brad claims; percussion drilling, 12 holes totalling 2,914 feet on EBL 27 to 32, 37, 40, and Rem 16 and 18.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 233; Assessment Reports 2369, 2680.

GRIZZLY, CU, KEN, SOU (No. 178, Fig. H)

Location: Lat. 51°17′ Long. 119°45′ (82M/5E, 5W)
At 3,100 feet elevation, on the southeast side, near the north end of East Barriere Lake.

Claims: GRIZZLY 1 to 6, CU 1 to 7, KEN 1 to 12, SOU 1.

Access: By gravel road from Barriere, 22 miles.

Operator: SOUVENIR MINES LTD., 205, 614 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, silver, zinc.

Description: Chalcopyrite and pyrite occur disseminated in metasedimentary rocks.

Work done: Reconnaissance magnetometer survey covering 10 claims.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 168; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 233; Assessment Report 2230.

BEX (No. 177, Fig. H)

Location: Lat. 51°17′ Long. 119°43′ (82M/5E)
Between 3,200 and 3,600 feet elevation, on East Barriere Lake.

Claims: BEX, RAN, DUN, etc., 63 in all.

Access: By road from Barriere, 26 miles.

Owner: BARRIERE EXPLORATIONS LTD., Box 17, Barriere.

Metals: Copper, nickel.

Description: Copper- and nickel-bearing sulphides are reported to occur in metasedimentary rocks near granitic rocks of the Upper Cretaceous Baldy Batholith.

Work done: Stripping, 9,200 square feet on Bex 12; surface diamond drilling, three holes totalling 616 feet on Bex 2 and 12.

References: *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 134; 1968, p. 169; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 233; Assessment Reports 1634, 1870.

WR (No. 208, Fig. H)

Location: Lat. 51°21′ Long. 119°42′ (82M/5E)
At approximately 2,500 feet elevation, at the junction of Barriere River and Fennell Creek.

Claims: WR 1 to 20.

Access: From Barriere by road, 25 miles.

Owner: WHITE RIVER MINES LTD., 420 Howe Street, Vancouver 1.

Metals: Gold, copper.

Description: Mineralized schist and gneiss area bounding porphyritic granite of Adams-Barriere Lakes Batholith.

Work done: Surface geological mapping, 1 inch equals 500 feet; geochemical survey, 430 samples covering WR 1 to 20.

SC (No. 176, Fig. H)

Location: Lat. 51°14–17′ Long. 119°37–44′ (82M/4E, 5E)
At approximately 5,200 feet elevation, at headwaters of Spapilem Creek.

Claims: SC 1 to 224.

Access: By road from Adams Lake, 5 miles.

Owner: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

Description: The property is located on the southern contact of the Upper Cretaceous Baldy Batholith. Biotite-quartz monzonite intrudes light-coloured gneiss and grey to green mica and chlorite schist. Chalcopyrite-bearing float is reported from the head of Spapilem Canyon, but no mineralization was found in place.

Work done: Surface geological mapping, 1 inch equals 1,000 feet; magnetometer survey, 100 line-miles; electromagnetic survey, 100 line-miles; geochemical soil survey, 2,500 samples covering all claims.

Reference: Assessment Report 2654.

PC (No. 170, Fig. H)

Location: Lat. 51°10.7′ Long. 120°11.4–16.4′ (92P/8E, 8W)
At approximately 4,000 feet elevation, on the north side of Mount Hagen, east of Fishtrap Creek, approximately 4 miles west of Barriere.

Claims: PC, totalling 20; CP, totalling 32.

Access: From Barriere by road, 8 miles.

Owner: PYRAMID MINING CO. LTD., 640, 890 West Pender Street, Vancouver 1.

Metal: Copper.

Description: Copper mineralization is found in a complex pluton satellitic to the Thuya Batholith and including rocks of syenitic, granodioritic, and quartz dioritic composition.

Work done: Surface geological mapping, 1 inch equals 500 feet on the PC and CP claims; geochemical soil and silt survey, 535 samples.

ADAMS LAKE

MF, K (No. 175, Fig. H)

Location: Lat. 51°10′ Long. 119°48′ (82M/4W)
One mile west of Johnson Lake.

Claims: MF 1 to 6, K 41 to 46.

Access: By road from Louis Creek, 26 miles.

Owner: BARRIERE EXPLORATIONS LTD., Box 17, Barriere.

Metals: Copper, lead, silver, barite.

Description: Occurrences of copper, lead, silver, and barium ore reported in Permian or older limestone and greenschist cut by a quartz-bearing intrusive.

Work done: Surface diamond drilling, one hole totalling 105 feet on MF 1.

HOMESTAKE (No. 174, Fig. H)

Location: Lat. 51°04–07′ Long. 119°45–51′ (82M/4W)
At approximately 3,000 feet elevation, about 3 miles west along the Squaam Bay–Louis Creek road from the head of Squaam Bay on Adams Lake.

Claims: One hundred and eleven JOE, KAM, H, MAX, and certain Crown-granted claims.

Access: By Squaam Bay road from Louis Creek, 18 miles.

Owner: Kamad Silver Co. Ltd.

Operator: CRAIGMONT MINES LIMITED, Box 3000, Merritt.

Metals: Barite, silver, lead, zinc, copper.

Description: Barite veins and stringers up to 30 feet wide cut sheared pyritiferous talcose quartz sericite schists. The barite contains varying amounts of tetrahedrite, galena, sphalerite, pyrite, chalcopyrite, argentite, and minor native silver.

Work done: Topography mapped; surface workings mapped; surface geological mapping, 1 inch equals 40 feet on Joe 71, 72, 74, and 85; underground geological mapping, 1 inch equals 40 feet on accessible parts of old workings; geochemical soil survey, 500 samples covering Joe 71, 72, 74, and 75; surface levelled for mine-mill building location.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1964, p. 99.

VIC (No. 173, Fig. H)

Location: Lat. 51°03–04′ Long. 119°40–42′ (82M/4E)
Between 2,350 and 4,500 feet elevation, on the east side, 8 miles north of south end of Adams Lake.

Claims: VIC 1 to 8, 10 to 17, 19 to 21, 23; VIC 9, 18, 22 Fractions.

Access: From Kamloops via Squilax by road and boat, 45 miles.

Owner: D. K. BRAGG, 3567 West 27th Avenue, Vancouver 8.

Metals: Copper, zinc, lead, silver.

Description: Quartz veins carrying pyrite, chalcopyrite, sphalerite, and galena are found in greenschist, phyllite, limestone, and quartz-sericite schist of Permian or older age.

Work done: Topography mapped; surface geological mapping, 1 inch equals 400 feet on Vic 1 to 6 and 10 to 13; geochemical soil survey, 352 samples covering Vic 1 to 6 and 10 to 13; trenching, five small cuts on Vic 4.

Reference: Assessment Report 2650.

EX, EX1, C1 (No. 204, Fig. H)

Location: Lat. 51°03.6′ Long. 119°32.3′ (82M/4E)
At headwaters of Nikwikwaia Creek, 3 miles south of Pisima Mountain on Adams Plateau, between 4,500 and 5,900 feet elevation.

Claims: One hundred and fifty contiguous claims held by location and two Crown-granted fractions.

Access: Sixteen miles north from Squilax by road.

Owner: GIANT METALLICS MINES LIMITED, 301, 845 West Pender Street, Vancouver 1.

Metals: Silver, lead, zinc.

DESCRIPTION: Area underlain by thick series of sedimentary and volcanic rocks, limestone, greenstone schist, quartzite, and phyllite. Principal minerals are sphalerite, galena, and pyrrhotite.

WORK DONE: Electromagnetic survey, 22,170 feet on EX, EX1, C1, Spar, and F claims.

MIKE, MARGE (No. 207, Fig. H)

LOCATION: Lat. 51°07′ Long. 119°25′ (82M/3W)
At approximately 5,400 feet elevation, on Snuffbox Creek, a tributary of Scotch Creek, 6 miles east of Pisima Mountain on Adams Plateau.

CLAIMS: MIKE 1 to 14, MARGE 1 to 4.

ACCESS: Twenty-two miles from the Trans-Canada Highway by road, thence logging-trail for 6 miles.

OWNER: LICHEN MINES LIMITED, 301, 845 West Pender Street, Vancouver 1.

METALS: Silver, lead.

DESCRIPTION: In the exposed showing the rock types are sericite schist, limestone, and altered limestone. Two mineralized beds are visible. The minerals are galena, sphalerite, pyrite, cerrusite, pyrolusite, and iron oxide.

WORK DONE: Electromagnetic survey, 11,200 line-miles covering Marge 3, 4, and Mike 1, 2.

REFERENCE: Assessment Report 2776.

BLAIS CREEK

SHUSWAP, SNOW (No. 190, Fig. H)

LOCATION: Lat. 51°26–29′ Long. 118°49–53′ (82M/7W)
Between 5,600 and 6,000 feet elevation, 23 miles north of the head of Seymour Arm (Shuswap Lake) and on the south side of Blais Creek.

CLAIMS: SHUSWAP, SNOW, GN, totalling 74.

ACCESS: From Revelstoke by helicopter or by 23 miles of roads and trails from the head of Seymour Arm.

OWNER: GREAT NORTHERN PETROLEUMS AND MINES LTD., 110, 505 Burrard Street, Vancouver 1.

METALS: Copper, lead, zinc.

DESCRIPTION: The mineralization is in rocks of the Shuswap metamorphic complex. It is reported to consist of galena, sphalerite, pyrrhotite, magnetite, tetrahedrite, and molybdenite and to lie 100 feet east of a prominent bed of marble which can be traced intermittently from Blais Creek to Ratchford Creek. The zone dips 35 degrees southwest, parallel with the bedding in the host rocks, and has been traced on the surface for more than 2,000 feet, with widths up to 12 feet. Underground, the zone has been followed by a tunnel for 800 feet, the width averaging 18 to 24 inches.

WORK DONE: Surface geological mapping on Shuswap 11 to 16, Snow 1 to 6, and GN 1 to 38; 19 trenches totalling 3,736 cubic feet; reopened and retimbered Copper King adit.

REFERENCES: *Geol. Surv., Canada,* Paper 64-32, p. 28; Map 12-1964; Assessment Reports 1768, 2637.

NAKUSP

ANNIS, DAWN, LAKEVIEW (No. 99, Fig. H)

LOCATION: Lat. 50°47.5′ Long. 119°03.5′ (82L/14E)
At 2,500 feet elevation, between Mara Lake and the Shuswap Arm of Shuswap Lake.
CLAIMS: ANNIS, DAWN, LAKEVIEW.
ACCESS: From Highway 1 by road, 2 miles.
OWNER: ANNIS MINES LTD., Monte Lake.
METALS: Silver, lead, zinc, copper.
WORK DONE: Trenching, 150 feet on Annis 5 and 6.
REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 135.

SALMON ARM

GALAXY, NOVA (No. 114, Fig. H)

LOCATION: Lat. 50°42′ Long. 119°25.9′ (82L/11W)
On top of mountain, 7 miles due west of Salmon Arm.
CLAIMS: GALAXY, NOVA.
ACCESS: By road from Salmon Arm, 12 miles.
OPERATOR: NEGAS MINING AND EXPLORATION LTD., 1413 Tranquille Road, Kamloops.
WORK DONE: Ground magnetometer survey.
REFERENCE: Assessment Report 2756.

FALKLAND

SWAN (No. 113, Fig. H)

LOCATION: Lat. 50°33.5′ Long. 119°33.5′ (82L/12E)
On hill, 3½ miles due north of Falkland at 5,200 feet elevation.
CLAIMS: SWAN 1, 9 to 11.
ACCESS: By road from Falkland.
OWNER: GUNNEX LIMITED, 1019, 409 Granville Street, Vancouver 2.
METAL: Copper.
DESCRIPTION: Porphyry-type mineralization in and around a small granitic pluton intruding quartzites.
WORK DONE: Topography mapped; surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 8.75 line-miles; geochemical soil survey, 219 samples covering Swan 1, 9 to 11.
REFERENCE: Assessment Report 2711.

HEFFLEY LAKE

NAN (No. 77, Fig. H)

LOCATION: Lat. 50°50.1′ Long. 120°02.9′ (92I/16E)
On north side of Heffley Lake, 2¼ miles east of the east boundary of Indian Reserve 5, 16 miles northeast of Kamloops.
CLAIMS: NAN 1 and 2.
ACCESS: By road from Kamloops via Heffley Lake road.
OPERATOR: J. M. BLACK, 843 Prospect Avenue, North Vancouver.
DESCRIPTION: Spotty outcrops of volcanic rocks, probably Cache Creek Group.
WORK DONE: Ground magnetometer and geological surveys.
REFERENCE: Assessment Report 2597.

EVE (No. 76, Fig. H)

LOCATION: Lat. 50°50.4′ Long. 120°04.5′ (92I/16E)
On north shore of Heffley Lake, about three-quarters of a mile east of the east boundary of Indian Reserve 5, 16 miles northeast of Kamloops.

CLAIMS: EVE 3 and 9.

ACCESS: By road from Kamloops via Heffley Lake road.

OPERATOR: WESTERN CANADA STEEL LIMITED, 640 West Hastings Street, Vancouver 2.

METAL: Iron.

DESCRIPTION: Spotty outcrops of Cache Creek Group rocks and some gabbro intrusive.

WORK DONE: Geological, scintillometer, and ground magnetometer surveys.

REFERENCE: Assessment Report 2600.

MOUNT FLEET

MARG, SYLVIA, BRUCE, LY (No. 75, Fig. H)

LOCATION: Lat. 50°48′ Long. 120°08′ (92I/16E)
On and around Mount Fleet, 11 miles northeast of Kamloops.

CLAIMS: MARG 1 to 12, SYLVIA 1 to 12, BRUCE 1 to 4, LY 1 to 31.

ACCESS: By road from Kamloops.

OPERATOR: KENNCO EXPLORATIONS, (WESTERN) LIMITED, 730, 505 Burrard Street, Vancouver 1.

DESCRIPTION: Syenitic igneous rocks intrude Cache Creek sedimentary and volcanic rocks.

WORK DONE: Geological, soil sample geochemical, induced polarization, and resistivity surveys.

REFERENCES: Assessment Reports 2585, 2586.

JAMIESON CREEK

POLE STAR (No. 132, Fig. H)

LOCATION: Lat. 50°52.8′ Long. 120°20.1′ (92I/16W)
Between Lanes and Jamieson Creeks, 3 miles west of the North Thompson River, opposite Heffley Creek settlement.

CLAIMS: Mineral Lease M-29, Lot 1012.

ACCESS: By logging-road from the Westsyde road, 3 miles.

OWNER: ELECTRA MINES LTD., 1257 Douglas Street, Prince George.

METALS: Silver, lead.

DESCRIPTION: Large quartz vein in intrusive plug.

WORK DONE: Trenching, 35 feet; underground work (extension of shaft), 10 by 20 by 10 feet.

KAMLOOPS

IM (No. 18, Fig. H)

LOCATION: Lat. 50°34.6–36.9′ Long. 120°18.9–21.3′ (92I/9W)
Adjacent to Knutsford, to south.

CLAIMS: IM 1 to 74, REG 1 to 16.

ACCESS: By road from Highway 5 (Kamloops–Merritt).

OWNER: GREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD., 736 Eighth Avenue SW., Calgary 2, Alta.

Metal: Copper.

Work done: Surface diamond drilling, eight holes totalling 3,386 feet; percussion drilling, 21 holes totalling 6,550 feet.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 236.

MR (No. 87, Fig. H)

Location: Lat. 50°36′ Long. 120°21′ (92I/9W)
At approximately 3,500 feet elevation, 5 miles southwest of Kamloops.

Claims: MR 1 to 29.

Access: By road from Kamloops, 5 miles.

Owner: ROYAL CANADIAN VENTURES LTD., 270, 180 Seymour Street, Kamloops.

Metal: Copper.

Description: Property straddles a portion of the southwest contact of the Iron Mask Batholith.

Work done: Surface geological map, 1 inch equals 400 feet on all claims; magnetometer survey, 30 line-miles covering MR 1 to 24; geochemical soil survey, 630 samples covering MR 1 to 24.

Reference: Assessment Report 2821.

ACE, MOT (No. 67, Fig. H)

Location: Lat. 50°32.9–34′ Long. 120°19.6–21.9′ (92I/9W)
Between 1,800 and 2,500 feet elevation, just west of McLeod Lake, 5 miles south of Knutsford.

Claims: ACE 1 to 10, MOT 1 to 20.

Access: By road from Kamloops.

Operator: ERIN EXPLORATIONS LTD., 1700, 777 Hornby Street, Vancouver 1.

Metal: Copper.

Work done: Ground magnetometer survey on Ace 1 to 8 and Mot 3 to 10, 13 to 18 claims, totalling 16.6 line-miles.

Reference: Assessment Report 2260.

MAKAOO (No. 33, Fig. H)

Location: Lat. 50°38.7′ Long. 120°23.7′ (92I/9W)
At approximately 3,000 feet elevation, 5 miles southwest of Kamloops.

Claims: Seventy-two claims owned by Makaoo Development Company Limited and 84 claims owned by Rolling Hills Copper Mines Limited.

Access: By road from Kamloops, 8 miles.

Owners: Makaoo Development Company Limited and Rolling Hills Copper Mines Limited.

Operator: ROLLING HILLS COPPER MINES LIMITED, Box 4183, Station D, Vancouver 9.

Metals: Copper, silver, gold.

Description: Chalcopyrite and bornite occur as disseminations and fracture-fillings in shear zones near contact between diorite of Iron Mask Batholith and intrusive picrite.

Work done: Surface workings on southeast corner of property surveyed; three surface holes totalling 1,600 feet diamond drilled on Jet 19, Caddie 7, and Noonday Crown grant.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 235.

AFTON (No. 19, Fig. H)

LOCATION: Lat. 50°40′ Long. 120°30′ (92I/10E)
At 2,400 feet elevation, adjacent to the Trans-Canada Highway, 8 miles west of Kamloops.

CLAIMS: AFTON 1 to 8, ADD 1 to 30, POT 1 to 9, DOMINION (Lot 1595) (Mineral Lease 22).

ACCESS: Ten miles from Kamloops by road.

OWNER: AFTON MINES LTD., Box 4183, Vancouver 9.

METAL: Copper.

DESCRIPTION: Chalcopyrite and native copper disseminated in altered igneous rocks of Kamloops assemblage (syenite, diorite, picrite).

WORK DONE: Surface diamond drilling, five holes totalling 2,500 feet on the Afton 1 to 4 and Dominion claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 237.

ZZ (No. 98, Fig. H)

LOCATION: Lat. 50°41′ Long. 120°31′ (92I/10E)
Just north of the Trans-Canada Highway, approximately 7 miles west of Kamloops.

CLAIMS: ZZ 1 to 27.

ACCESS: By road from Kamloops, 7 miles.

OWNER: GRANDEUR MINES LTD., 24, 448 Seymour Street, Vancouver 2.

METAL: Copper.

WORK DONE: Magnetometer survey, approximately 27 line-miles covering ZZ 1 to 27.

REFERENCE: Assessment Report 2323 (geochemical, 1969).

CAD (No. 78, Fig. H)

LOCATION: Lat. 50°43′ Long. 120°36.8′ (92I/10E)
On south shore of Kamloops Lake, 1 mile east of mouth of Cherry Creek, about 13 miles west of Kamloops.

CLAIMS: CAD 1 to 5.

ACCESS: Highway 1.

OWNER: GUY B. ALLEN, 4704—30th Avenue SW., Calgary, Alta.

METALS: Iron, copper.

DESCRIPTION: Nicola volcanic rocks intruded by granodiorite.

WORK DONE: Soil sample geochemical and ground magnetometer surveys.

REFERENCE: Assessment Report 2619.

KON, WIN (No. 102, Fig. H)

LOCATION: Lat. 50°39′ Long. 120°33′ (92I/10E)
On Dominic Lake road, 6 miles southeast of Cherry Creek.

CLAIMS: KON 1 to 10, WIN 1 to 22, STAN 1 to 6.

ACCESS: From Highway 1 by road, 2 to 3 miles.

OWNER: CONCORDE EXPLORATIONS LTD., 24, 448 Seymour Street, Vancouver 2.

METAL: Copper.

WORK DONE: Surface geological mapping on Kon and Win claims; geochemical soil survey, 850 samples covering Win 11 to 20.

RAG, APOLLO (No. 24, Fig. H)

Location: Lat. 50°34.5–37.4′ Long. 120°39.4–43.2′ (92I/10E) From 5,000 to 5,400 feet elevation, between Durand, Kwilalkwila, and Dominic Lakes, 8 miles south of Cherry Creek.

Claims: RAG 1 to 44, 46 to 53, 57 to 96; RAG A, B, C, D, E, F Fractions; APOLLO 1 to 13; APOLLO A Fraction.

Access: By Dominic Lake road from Trans-Canada Highway at Cherry Creek, 18 miles.

Owner: COMINCO LTD., 800, 1155 West Georgia Street, Vancouver 5.

Metal: Copper.

Description: Low-grade disseminated chalcopyrite and bornite mineralization associated with weak chlorite and epidote alteration in monzonite core of a Jurassic stock intrusive into Upper Triassic Nicola Volcanic Group lavas. Some pyrite and copper sulphides in contact zone.

Work done: Claims and topography mapped; surface geological mapping, 1 inch equals 1,000 feet and 1 inch equals 400 feet on all Rag claims; induced polarization survey and ground magnetometer survey, 18 line-miles covering 48 Rag claims and fractions; geochemical soil survey, approximately 500 samples covering some Rag claims and Apollo claims; road construction, about 1.7 miles on central and western parts of Rag claims; percussion drilling, 18 holes totalling 5,400 feet on 12 Rag claims.

Reference: Assessment Report 2511.

PINE (No. 101, Fig. H)

Location: Lat. 50°30′ Long. 120°28′ (92I/8W, 9W) Between Le Jeune and McConnell Lakes, 14 miles southwest of Kamloops.

Claims: PINE 1 to 110.

Access: From Kamloops by road, 12 miles.

Owner: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

Description: Jurassic Nicola granitic batholith intrudes Upper Triassic Nicola Group volcanics. Claims partly overlain by Miocene Kamloops Group volcanics.

Work done: Surface geological mapping, 1 inch equals 1,000 feet on Pine 1 to 110; airborne magnetometer survey, 113.3 line-miles covering Pine 1 to 110; induced polarization survey covering east half of claims; geochemical soil, stream, and biogeochemical survey, 736 samples covering an irregular section.

KR&K (No. 206, Fig. H)

Location: Lat. 50°29.3′ Long. 120°31′ (92I/7E, 8W) At approximately 4,100 feet elevation, north and west of Lac Le Jeune and adjoining the northeast corner of Walloper Lake.

Claims: KR&K 101 to 148, 163 to 168.

Access: By road from Kamloops, 17 miles.

Owner: NICOLA COPPER MINES LTD., 9897—138A Street, Surrey.

Metals: Copper, molybdenum.

Work done: Surface diamond drilling, one hole totalling 102 feet on KR&K 109.

KR&K (No. 205, Fig. H)

Location: Lat. 50°28.2′ Long. 120°40′ (92I/7E)
At approximately 3,400 feet elevation, one-half to 1 mile east of Greenstone Creek on the north side of Meadow Creek.

Claims: KR&K 58, 65, 67, 69, 71, 73, 149 to 162.

Access: By road from Kamloops, approximately 21 miles.

Owner: NICOLA COPPER MINES LTD., 9897—138A Street, Surrey.

Metal: Copper.

Work done: Surface diamond drilling, one hole totalling 71 feet on KR&K 63 claim.

CARABINE CREEK

MERC (No. 7, Fig. H)

Location: Lat. 50°49–52′ Long. 120°44–48′ (92I/15W)
At 3,200 feet elevation on hill east of Carabine Creek, 4 miles north of Copper Creek Station.

Claims: MERC 1 to 17, 29 to 65, LA 1 to 6, LEE 1 to 3, WEDGE 1 Fraction, 64 in all.

Access: By dirt road and trail from Savona, 23 miles.

Owner: CNW Oil Limited.

Operator: SAVANNA CREEK GAS & OIL LIMITED, 920, Three Calgary Place, 355 Fourth Avenue SW., Calgary 1, Alta.

Metal: Mercury.

Description: Cinnabar occurs within or marginal to brecciated zones associated with felsic dyke swarms intruding volcanics.

Work done: Surface geological mapping, 1 inch equals 400 feet on Lee 1 to 3 and Merc 60 to 65 claims; underground geological map, 1 inch equals 400 feet on Lee 3 claim; geochemical work, 500 line-miles on Lee 1 to 3, LA 1, and Merc 2, 4, 6, 15, 17, 29, 31, 32, 36, 48, 50, and 53 claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 240; Assessment Report 2467.

BONAPARTE

MAGGIE MINE (No. 127, Fig. H)

By W. J. McMillan

Location: Lat. 50°55.4′ Long. 121°25.7′ (92I/14W)
At approximately 2,500 feet elevation, immediately west of Highway 99 in the valley of Bonaparte Creek, 9 miles north of Cache Creek.

Claims: M, MAG, Mineral Lease M-33 (comprising Lots 410 to 421), totalling 143.

Access: By the Cariboo highway from Cache Creek, 9 miles.

Owner: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description:

The deposit underlies the valley of Bonaparte Creek and has no surface exposure. However, it has an extensive halo of gossan, a portion of which is exposed in the west wall of Bonaparte Creek valley where it is visible from the highway.

Mineralization occurs in and adjacent to quartz diorite porphyry which intrudes argillite, siliceous argillite, andesitic tuff, and andesitic flows of the Permian Cache Creek Group. Both the porphyry and the enclosing country rock have been pervasively veined with quartz and altered. Principal alteration products are sericite, kaolinite, and, near the contact of the porphyry, biotite. Pyrite is abundant both in quartz veins and as disseminated grains. In the deposit, it is joined by chalcopyrite and molybdenite which are similarly distributed. The deposit is approximately 800 feet wide and extends 2,800 feet along Bonaparte Valley. It is reported to contain 100 million tons of 0.4 per cent copper equivalent. A drill-core sample of biotitized porphyry supplied by D. Miller, of Bethlehem Copper Corporation Limited, was submitted for whole rock potassium-argon analysis. An age of 61.1±2 million years was obtained by J. E. Harakal at the University of British Columbia.

WORK DONE: Claims and surface workings mapped; surface geological mapping, 1 inch equals 500 feet on all claims; surface diamond drilling, 15 holes totalling 14,232 feet on Lot 410 and M 1 to 3, 5, and 8; percussion drilling, 57 holes totalling 16,940 feet on Lots 410, 411, 412, 418, and 419, and M 1 to 6, 8, 12, and 22.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 241; *Northern Miner*, August 28, 1970, p. 1; Assessment Report 2020.

MO, MA, KID (No. 127, Fig. H)

LOCATION: Lat. 50°52.3–55.5′ Long. 121°23.1–28.7′ (92I/14W)
Between 2,500 and 3,000 feet elevation, approximately 8 miles northwest of Cache Creek, along west side of the old Maggie mine.

CLAIMS: MO, MA, KID, totalling 127.

ACCESS: From Cache Creek by Highway 2, approximately 10 miles.

OPERATOR: PENARROYA CANADA LIMITEE (Western Division), 1960, 1055 West Hastings Street, Vancouver 1.

DESCRIPTION: Cache Creek Series—volcanics, cherts, limestone, argillite.

WORK DONE: Geochemical stream silt survey, six samples and soil survey, 220 samples covering Mo 5 to 30, 39 to 47, and Ma 11 to 30, 57 to 70; surface diamond drilling, one hole totalling 418 feet on Mo 9; percussion drilling, nine holes totalling 1,563 feet on Mo 7, 9, 10, 21, 23, 24, 26, 42.

AGATE (No. 127, Fig. H)

LOCATION: Lat. 50°55.9′ Long. 121°24.2′ (92I/14W)
At 2,000 to 2,500 feet elevation on east side of the Bonaparte River, about 9 miles northwest of Cache Creek.

CLAIMS: AGATE 1 to 15.

ACCESS: By Highway 97 from Cache Creek, 10 miles.

OWNER: CANADA WEST PETROLEUMS LTD., Box 4183, Station D, Vancouver 9.

METALS: Copper, molybdenum.

DESCRIPTION: Copper and molybdenum mineralization in altered Cache Creek rocks that have been intruded by porphyry dykes.

WORK DONE: Claim survey, scale 1 inch equals 300 feet; rotary drilling, 500 feet in one hole on Agate 13 claim.

BUG, IRISH, GOSSAN (No. 127, Fig. H)

LOCATION: Lat. 50°54.7–56.5′ Long. 121°23.4–25′ (92I/14W)
At 1,700 to 2,400 feet elevation, 8½ miles northwest of Cache Creek on the east side of Bonaparte River.

CLAIMS: BUG 1 to 14; IRISH 1 to 6; GOSSAN 1 to 13; PIT 1 to 3 Fractions; IRA 1, 2 Fractions; GOSS Fraction.

Access: Via Highway 97 from Cache Creek, 8½ miles.

Operator: ROLLING HILLS COPPER MINES LIMITED, Box 4183, Station D, Vancouver 9.

Metals: Copper, molybdenum.

Description: Copper and molybdenum sulphides occur as disseminations and fracture-fillings in porphyry intrusive and highly altered Cache Creek metasediments.

Work done: Claim survey, 1 inch equals 500 feet; surface diamond drilling, two holes totalling 1,148 feet on Bug 9 claim; rotary drilling, four holes totalling 1,500 feet on Bug 7 and 8 and Irish 4 claims; percussion drilling, four holes totalling 780 feet on Bug 9 and 10 claims.

THOMPSON RIVER

RED HILL (RJ, BEDARD) (No. 95, Fig. H)

Location: Lat. 50°39.5′ Long. 121°21′ (92I/11W)
At approximately 2,500 feet elevation, 9 miles south of Cache Creek, astride the Trans-Canada Highway.

Claims: RJ 1 to 51, BEDARD 1 to 18.

Access: By the Trans-Canada Highway from Ashcroft, 9 miles.

Operators: CERRO MINING COMPANY OF CANADA LIMITED, 401, 1111 West Georgia Street, Vancouver 5, and DUCANEX RESOURCES LIMITED, 2306, 401 Bay Street, Toronto 103, Ont.

Metal: Copper.

Description: Red Hill is underlain by rocks of the Cache Creek Group which are apparently intruded by an offshoot of the Guichon Creek Batholith. In the vicinity of Red Hill the rocks are extensively stained by iron oxides.

Work done: Surface geological mapping, 1 inch equals 1,000 feet; magnetometer survey, 90 line-miles covering all claims; percussion drilling, 12 holes totalling 3,150 feet.

Reference: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 174.

CM, DN (No. 80, Fig. H)

Location: Lat. 50°37.5′ Long. 121°17′ (92I/11W)
Between 2,600 and 3,400 feet elevation on the west slope of Glossy Mountain, 7 to 8 miles south of Ashcroft.

Claims: CM 9, 10, 15 to 22; DN 1 to 34.

Access: By road from Ashcroft.

Owner: GRANDORA EXPLORATIONS LTD., 511, 850 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: At contact of Guichon Creek Batholith and Nicola volcanics.

Work done: Ground magnetometer survey.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 241; Assessment Report 2596.

SALT (No. 97, Fig. H)

Location: Lat. 50°35′ Long. 121°20′ (92I/11W)
At 2,500 feet elevation, 1 mile west of the Trans-Canada Highway, immediately northeast of Venables Lake, adjoining Indian Reserve 5 to the west.

Claims: SALT 1 to 8, plus SALT Fraction, BASQUE Fraction, BASQUE No. 4, and BASQUE No. 8 mineral leases.

Access: From Cache Creek by highway and gravel road, 17 miles.

Owner: TEXAS GULF SULPHUR COMPANY, 701, 1281 West Georgia Street, Vancouver 5.

Metal: Copper.

Description: Sparse pyrite and occasional traces of chalcopyrite occur in heavily sheared rhyolite near a contact with argillaceous sedimentary rocks.

Work done: Surface geological mapping, 1 inch equals 1,000 feet, and geochemical soil survey, approximately 400 samples covering all claims.

AB (No. 74, Fig. H)

Location: Lat. 50°29′ Long. 121°20′ (92I/6W)
Adjoining east side of Indian Reserve 6 on east side of Twaal Creek, 4 miles due north of Spences Bridge.

Claims: AB 18 to 25.

Access: By road from Spences Bridge.

Operator: ANGLO-BOMARC MINES LTD., 301, 540 Burrard Street, Vancouver 1.

Metal: Copper.

Work done: Soil sample geochemical survey, 349 samples.

Reference: Assessment Report 2584.

ROCKY, TOM, NAV (No. 73, Fig. H)

Location: Lat. 50°15.6–18.1′ Long. 121°26.4–30′ (92I/6W)
On south slopes of the Scarped Range, adjacent to Pitquah to the north, about 5 miles east of Lytton.

Claims: Thirty-one claims, under the names ROCKY, TOM, NAV, and MACO.

Access: From Canadian National Railways tracks at Pitquah.

Operator: LYTTON MINERALS LIMITED, 519, 602 West Hastings Street, Vancouver 2.

Metal: Copper.

Description: Disseminated chalcopyrite in a layered intrusive.

Work done: Geological and ground magnetometer surveys.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 241; Assessment Report 2534.

NESIKEP CREEK

MUD, CHERRY, RICKHILL, SHARON (No. 44, Fig. H)

Location: Lat. 50°30.9′ Long. 121°46.8′ (92I/12W)
On Nesikep Creek, west of Fraser River, about 15 miles southeast of Lillooet.

Claims: MUD 1, 2; CHERRY 1 to 14; RICKHILL 1 to 8; SHARON 1, 2; NANCY 1 to 15; JOYCE 1 to 11; RUSTY 1 to 4.

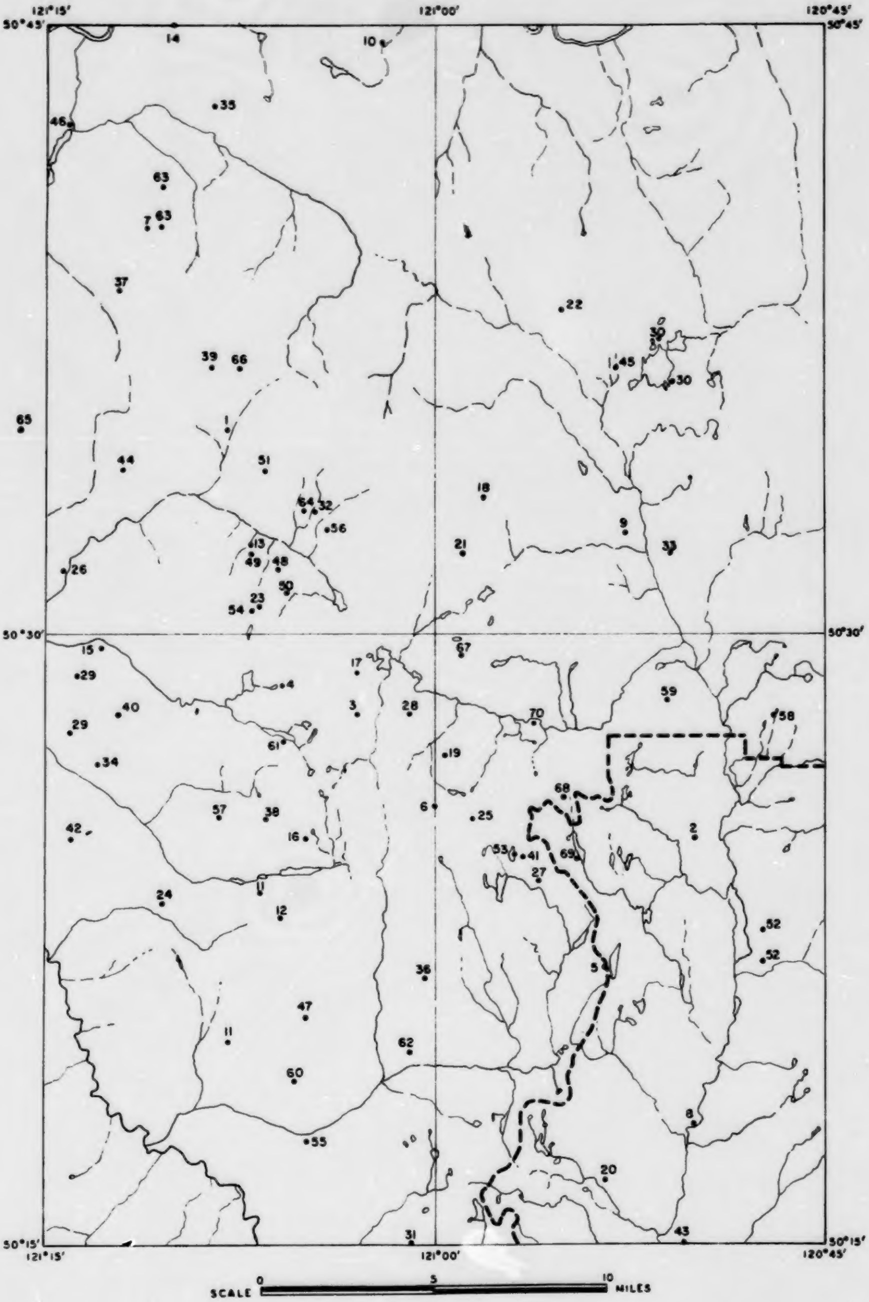
Access: By road from Lillooet.

Owner: DALEX MINES LTD., 626 Howe Street, Vancouver 1.

Metal: Copper.

Work done: Geochemical survey covering Nancy 3 to 15, Joyce 3 to 5, 8 to 10, and Sharon 2.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 242; Assessment Report 2530.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31
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SCALE
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MILES

Figure J

Key map showing locations of mining properties in Highland Valley Area.

KEY TO PROPERTIES ON INDEX MAP, FIGURE J

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2 MLM, GCM, LEE, page 370.
3 SHORTY, page 350.
4 OK (Alwin), page 346.
5 CHATAWAY, page 371.
6 AM, IDE, PEN (HIGHMONT), page 330.
7 HY, page 340.
8 HC, page 371.
9 DEB, page 337.
10 CHIEF, GEO, page 336.
11 TAM, KEY, MERU, CC, page 351.
12 JC, page 341.
13 VERA, DIA, page 359.
14 PYRITE, MAY, MUD, page 348.
15 RIV, page 349.
16 ROYAL, LOREX, IL, RC, page 349.
17 VALLEY COPPER, page 353.
18 BURL, page 332.
19 SHEBA, page 350.
20 TOP, page 372.
21 TROJAN, page 353.
22 HIGH, page 339.
23 TAM, KAM, JAC, RAF, page 351.
24 MEL, page 345.
25 ANN, page 330.
26 CHALCO, page 333.
27 PANTHER, SARAH, page 347.
28 LORNEX, page 344.
29 PI, page 347.
30 CAT, MAC, page 332.
31 PH, CT, page 347.
32 FEED, page 338.
33 JEAN, GRO, WOW, ROG, page 341.
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35 SAGE, page 350.
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37 BC, page 331.
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48 LORN, FLY, SNOW, MIJ, page 343.
49 NIM, page 345.
50 RAF, TAM, page 348.
51 MB, page 345.
52 RWS, ISY, page 371.
53 LEM, page 342.
54 TAM, KAM, JAC, RAF, page 352.
55 TAR, page 352.
56 DO, GO, page 337.
57 LORNA, MAT, PAM, JON, page 343.
58 HUNT, page 340.
59 JERICHO, page 341.
60 NITE, page 346.
61 ROYAL, page 349.
62 BIN, page 332.
63 HY, page 340.
64 FEED, page 339.
65 MAN, page 344.
66 TAC, page 351.
67 BETHLEHEM MINE, page 331.
68 NAT, GAP, FARGO, page 345.
69 AL, page 370.
70 JOE, BET, page 341.

HIGHLAND VALLEY

ALAMO (No. 36, Fig. J)

LOCATION: Lat. 50°21.5′ Long. 121°00.5′ (92I/6E, 7W)
Southeast of Spaist Mountain, east of Skuhost Creek, at elevation 5,000 feet.

CLAIMS: ALAMO 1 to 6.

ACCESS: From Merritt–Spences Bridge highway via Skuhun Creek road and the road up the east side of Skuhost Creek.

OWNER: SAN JACINTO EXPLORATIONS LIMITED, 2, 515 Granville Street, Vancouver 2.

METAL: Copper.

DESCRIPTION: Malachite occurs along shallow-dipping fractures in one trench.

WORK DONE: A photogeological analysis of the fracture density distribution was made. Targets outlined were trenched but overburden was deep and the water table shallow. No bedrock was exposed.

REFERENCE: Assessment Report 2327.

AM, IDE, PEN (Highmont) (No. 6, Fig. J)

LOCATION: Lat. 50°25.5–26.5′ Long. 120°59′ to 121°00′ (92I/7W)
At approximately 5,400 feet elevation on the northwest slope of Gnawed Mountain.

CLAIMS: AM 1 to 4, 5, 6 Fraction, 7 to 11; IDE 1, 3, 4 to 8, 12 to 18; NEW IDE 19, 20; ANN 3, 4, 7, 18, 20 Fractions; NEW ANN 11 Fraction; PHYLLIS Fraction; PEN 1 to 8, 1 Fraction.

ACCESS: Via Highland Valley highway and gravel road from Ashcroft, 35 miles.

OWNER: HIGHMONT MINING CORP. LTD., 812, 1177 West Hastings Street, Vancouver 1, or Box 700, Ashcroft.

METALS: Copper, molybdenum.

WORK DONE: Claims and workings mapped; surface geological mapping, 1 inch equals 400 feet on Pen claims; electromagnetic survey, 30 line-miles covering IDE 1 to 19 and Ann 4 and 11; electromagnetic survey, 10 line-miles covering Pen claims; induced polarization survey, 7 line-miles covering Pen claims; geochemical soil survey, 1,400 samples; road construction, 4 miles; trenching, 400 feet on Pen and 3,000 feet on IDE 20 claims; surface diamond drilling, 53,000 feet on IDE 1, 3, and 7 claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 244; Assessment Reports 286, 290, 1757.

ANN (No. 25, Fig. J)

LOCATION: Lat. 50°25.5′ Long. 120°58.5′ (92I/7W)
At approximately 5,500 feet elevation on the south face of Gnawed Mountain, near the peak.

CLAIMS: ANN 1 to 10; AM 13, 15 Fractions.

ACCESS: From Ashcroft by the Highland Valley highway and gravel road through Highmont property, 30 miles.

OWNER: TROJAN CONSOLIDATED MINES LTD., 846 West Hastings Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite mineralization occur in Skeena quartz diorite.

WORK DONE: Topography mapped; surface diamond drilling, six holes totalling 4,634 feet on Ann 1.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 244, 245.

BC (No. 37, Fig. J)

LOCATION: Lat. 50°38.5′ Long. 121°12′ (92I/11E)
East of the Highland Valley highway, due west of Glossy Mountain.

CLAIMS: BC 1 to 36, GC 63 to 68, 81, 82.

ACCESS: From Ashcroft by the Highland Valley highway and Barnes Lake road.

OWNER: CROYDON MINES LTD., 108, 718 Granville Street, Vancouver 2.

DESCRIPTION: The claims are underlain by rocks of the Nicola Group, Guichon Creek Batholith, and Kamloops Group.

WORK DONE: Soil samples were taken at 200-foot intervals along lines cut 400 feet apart. Approximately 45 line-miles was sampled.

REFERENCE: Assessment Report 2316.

BETHLEHEM MINE (No. 67, Fig. J)

By David Smith

LOCATION: Lat. 50°29.5′ Long. 120°59′ (92I/7W)
On the north side of the Highland Valley.

CLAIMS: The company holds 64 Crown-granted and 374 recorded mineral claims and fractions immediately east of Quiltanton (Divide) Lake.

ACCESS: By paved road from Ashcroft, 30 miles.

OWNER: BETHLEHEM COPPER CORPORATION LTD., 1818, 355 Burrard Street, Vancouver 1; mine address, Box 520, Ashcroft.

METAL: Copper (*see* Table 1 for production).

WORK DONE:

The mine is presently working on a continuous three-shift basis, with production coming from the Jersey pit and from the Huestis pit.

Major equipment in service includes 17 Haulpak 50-ton trucks, three 88-B Bucyrus-Erie shovels, three 475 Michigan loaders, two 45-R rotary drills, three D-8 tractor dozers, and two road-graders.

Mill capacity for 1970 remained at 15,000 tons per day. The entire production is trucked to wharves in North Vancouver for eventual shipment to Japan.

During 1970, limited diamond and percussion drilling were done on the Bethlehem property. Eight diamond-drill holes totalling 5,863 feet were drilled, and 560 feet of percussion drilling was done.

A 500-kw. diesel-driven generator was installed for emergency power in the mill. A 15-horsepower fan was installed in the mill for dust collection. A 150-horsepower pump was installed in No. 3 reclaim pumphouse. Three thousand feet of 5-kv. power-line was built on the tailings dam and 3,000 feet around the Huestis pit was relocated.

In 1970 the number of employees reached 360. Although no housing is available at the minesite, townhouses and apartment units are provided for employees in Ashcroft, and most employees commute from there.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 245, 246.

BIN (No. 62, Fig. J)

Location: Lat. 50°19.5–20′ Long. 121°00.5–01.5′ (92I/6E)
West of Skuhost Creek, at elevation 4,000 to 4,500 feet.

Access: A branch four-wheel-drive road from the Skuhun Creek road leads to the property.

Owner: B. I. NESBITT, 1100, 505 Burrard Street, Vancouver 1.

Description: Underlain by granodiorite of the Bethsaida phase of the Guichon Creek Batholith, which is locally cut by aplitic dykes.

Work done: A grid with north-south lines 500 feet apart was utilized and magnetometer readings taken at 100-foot intervals along them.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 246; Assessment Report 2806.

BIN (No. 47, Fig. J)

Location: Lat. 50°20.5′ Long. 121°05′ (92I/6E)
South of Skwilkwakwil Peak, at elevation 5,000 to 5,400 feet.

Claims: BIN 45 to 62, 65 to 78.

Access: From Spences Bridge–Merritt highway up Skuhun Creek and the road along the west side of Skuhost Creek.

Owner: Flagstone Mines Ltd.

Operator: PHELPS DODGE CORPORATION OF CANADA, LIMITED, 404, 1112 West Pender Street, Vancouver 1.

Work done: An induced polarization survey was run along east-west lines 400 feet apart. A 200-foot dipole-dipole electrode array with four dipole separations (n=1, 2, 3, 4) was employed.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 249; Assessment Report 2488.

BURL (No. 18, Fig. J)

Location: Lat. 50°33.3′ Long. 120°58′ (92I/10W)
At approximately 4,000 feet elevation on east slope of Bose Hill.

Claims: BURL 1 to 14, 15 Fraction.

Access: By Highland Valley highway and dirt road from Ashcroft, 35 miles.

Owner: BURLINGTON MINES & ENTERPRISES LTD., 818, 510 West Hastings Street, Vancouver 2.

Metal: Copper.

Description: Property is underlain by Guichon granodiorite and Kamloops volcanic rocks. Mineralization occurs in shear zones in the granodiorite.

Work done: Trenching, 1,500 feet on Burl 9 and 10.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 249.

CAT, MAC (No. 30, Fig. J)

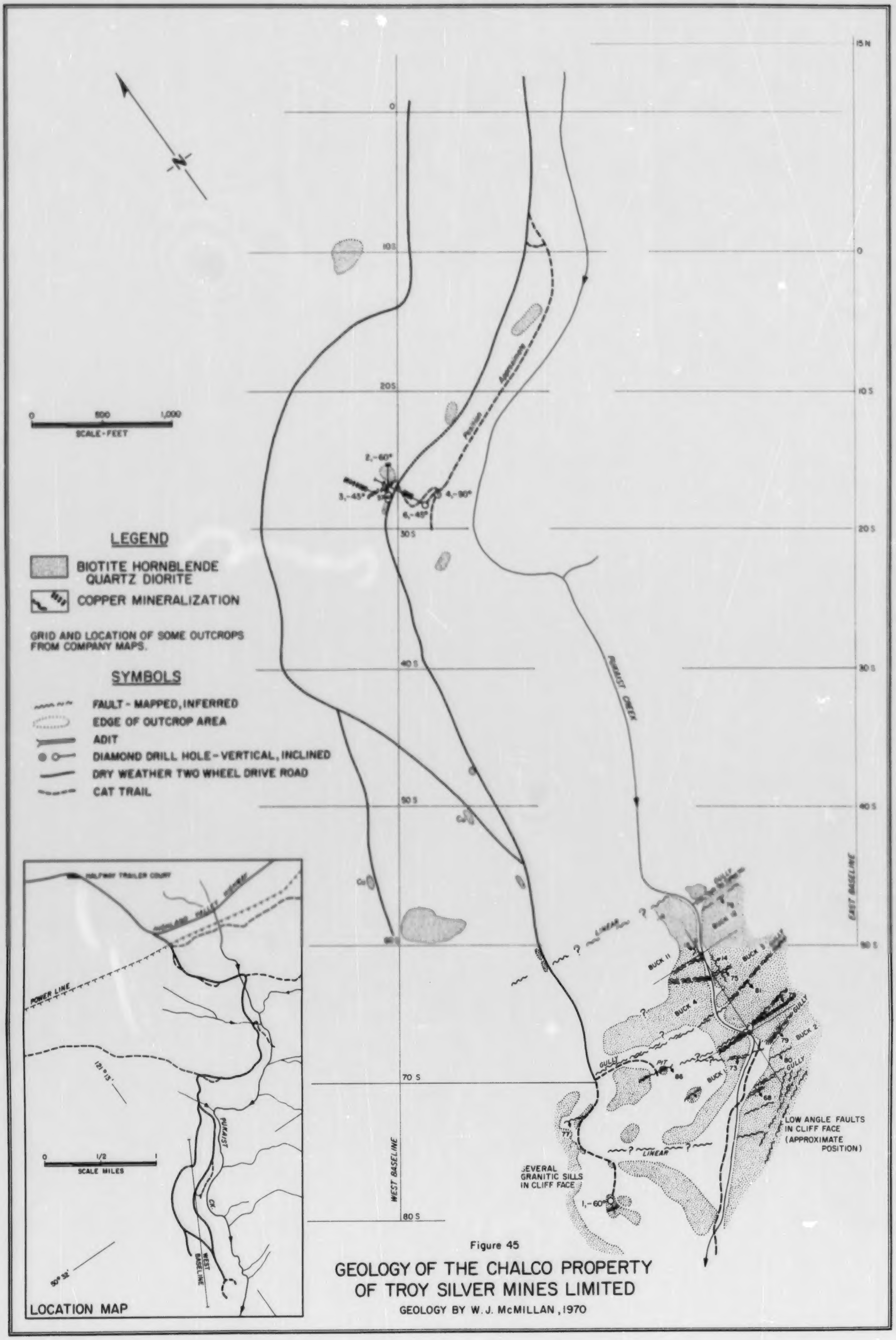
Location: Lat. 51°37.5′ Long. 120°51.5′ (92I/10W)
Adjoins Leighton Lake on the west, at elevation 3,800 feet.

Claims: CAT 1 to 14, MAC 1 to 10.

Access: From Savona 12 miles via Tunkwa Lake road or from Ashcroft via Highland Valley highway and Tunkwa Lake road.

Owner: ESTEY AGENCIES LTD., 1177 West Hastings Street, Vancouver 1.

Description: The property is underlain by Kamloops volcanic rocks.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500
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SCALE-FEET
LEGEND
BIOTITE HORNBLENDE QUARTZ DIORITE
COPPER MINERALIZATION
GRID AND LOCATION OF SOME OUTCROPS FROM COMPANY MAPS.
SYMBOLS
FAULT - MAPPED, INFERRED
EDGE OF OUTCROP AREA
ADIT
DIAMOND DRILL HOLE - VERTICAL, INCLINED
DRY WEATHER TWO WHEEL DRIVE ROAD
CAT TRAIL
15 N
0
10 S
20 S
30 S
40 S
50 S
60 S
70 S
80 S
EAST BASELINE
WEST BASELINE
PUKAIST CREEK
Position Approximate
2, -60°
3, -45°
4, -90°
6, -45°
Cu
LINEAR
BUCK 11
BUCK 10
BUCK 9
BUCK 4
BUCK 2
BUCK 1
GULLY
PIT
14
75
81
79
80
73
86
68
77
1, -60°
LOW ANGLE FAULTS IN CLIFF FACE (APPROXIMATE POSITION)
SEVERAL GRANITIC SILLS IN CLIFF FACE
HALFWAY TRAILER COURT
HIGHLAND VALLEY HIGHWAY
POWER LINE
121° 13'
50° 32'
0
1/2
1
SCALE MILES
PUKAIST
CK.
WEST BASELINE
LOCATION MAP

Figure 45

GEOLOGY OF THE CHALCO PROPERTY
OF TROY SILVER MINES LIMITED

GEOLOGY BY W. J. McMILLAN, 1970

Work done: Approximately 10 line-miles of electromagnetic survey on Cat 3 and 5 to 14 along 19 north-south lines at approximately 400-foot spacings.

References: Assessment Reports 2268, 2269.

CHALCO (No. 26, Fig. J)

By W. J. McMillan

Location: Lat. 50°31.5′ Long. 121°14.5′ (92I/11E)
The claims straddle Pukaist Creek at elevation 3,000 feet.

Claims: CHALCO 1 to 11, 44, 48, 49, 61, 62; CHALCO 45, 63 Fractions.

Access: Dirt roads lead southward from the Highland Valley highway to the property. The turnoff is about 14 miles from Ashcroft.

Owner: TROY SILVER MINES LTD., 305, 540 Burrard Street, Vancouver 1.

Metal: Copper.

Description:

Petrology

The Chalco property occurs entirely within a speckled grey-green and black quartz diorite that is part of the Hybrid phase of the Guichon Creek Batholith (Northcote, 1969). Mafic minerals compose 25 to 40 per cent of the rock and consist of subhedral biotite, hornblende, biotite and hornblende, or biotite and augite. The mafic minerals are slightly to pervasively chloritized. Most of the chlorite is a magnesium-iron chlorite (Albee, 1962, p. 868), with anomalous brown birefringence. Andesine is the typical plagioclase, but labradorite occurs in one pyroxene-bearing sample. The plagioclase crystals have a dusty appearance in thin-section as a result of moderate to extensive saussuritization or sericitization. Quartz and small amounts of perthitic potash feldspar fill angular spaces between subhedral plagioclase laths. Sphene, apatite, and magnetite are accessory.

A leucocratic dyke(?) is intersected by diamond-drill hole 4. It consists almost entirely of slightly propylitized andesine with accessory sphene, pyrite, and magnetite. Mixtures of calcite and subopaque yellow-brown iron oxide which are apparently pseudomorphous after biotite compose 5 per cent of the rock.

Faulting

Steep east to southeast-striking faults on the property control drainage patterns into Pukaist Creek. Although it is deeply incised, Pukaist Creek valley does not appear to be fault controlled because no fault zones were found paralleling the valley and because easterly striking faults cross the valley with no offset. Intersection of the east and east-southeast striking faults are likely to be subvertical, thus subvertical mineralized shoots could occur. Conversely, within fault zones, mineralized veins were observed to branch off a major fault, follow a secondary shear across the gouge zone, then follow a second major fault (Plate XV). Subhorizontal mineralized shoots could occur at the junctions of major faults and secondary shears. Post-mineralization subhorizontal faults occur which offset the steep easterly striking faults. Where it could be determined, dip-slip movement was less than 50 feet.

Tectonic Analysis

Two interpretations of the stress field responsible for east-west faulting are presented. The first suggests that the median principal stress (σ_2), which parallels fault intersections, was steeply inclined toward the south, and the maximum principal stress (σ_1) was subhorizontal east-west; the second that σ_1 was steep and σ_2 subhorizontal (Fig. 46). Field evidence suggests that both steeply inclined and

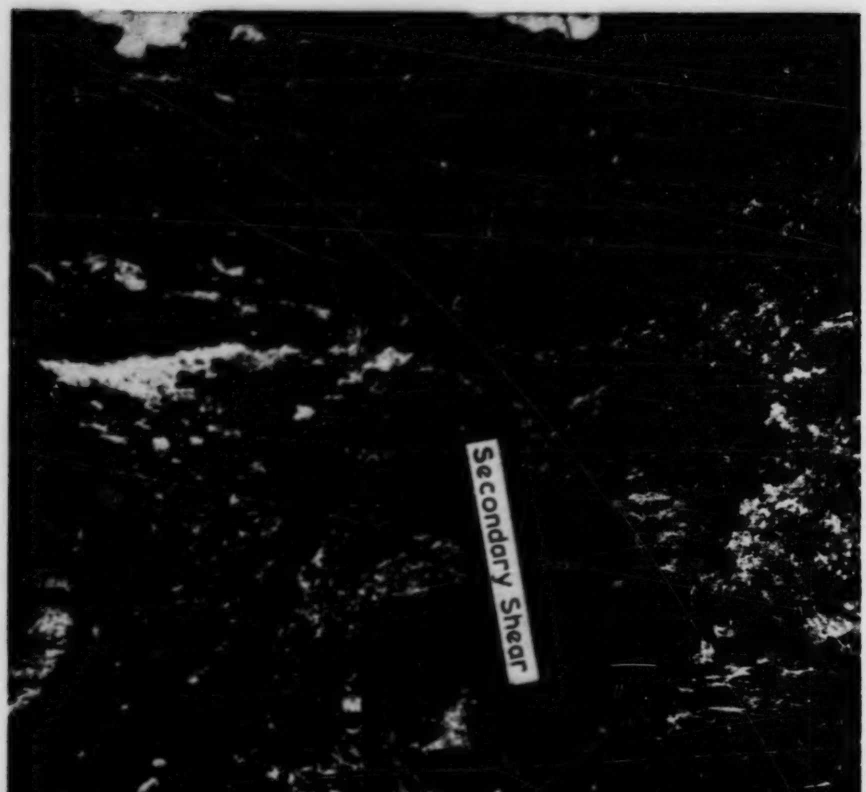

Secondary Shear
Mineralized Vein
Fault Zone
30'
Test Pit

Plate XV.—View westward across Pukaist Creek from the old adit on the Chalco property showing a mineralized vein which follows a secondary shear from the footwall to the hangingwall of the fault zone.

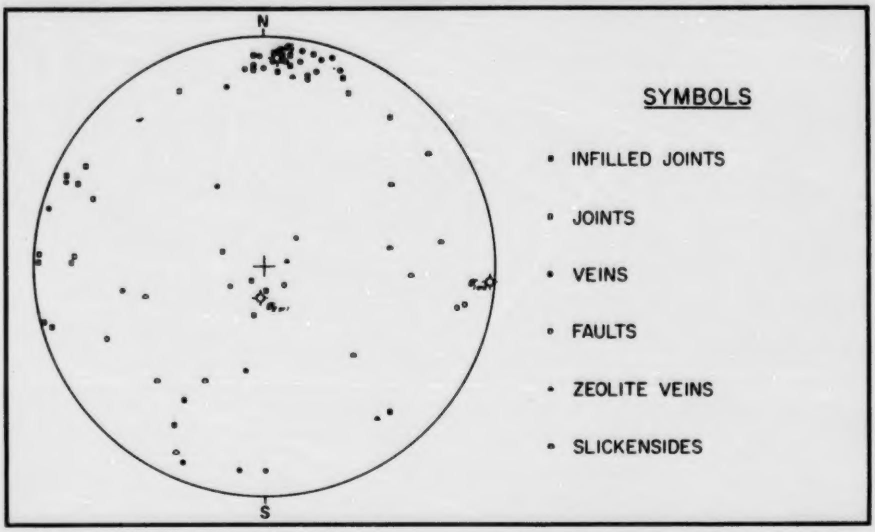


Figure 46. Equal area projection of structural data from the Chalco property. Poles to planar structures are plotted.

subhorizontal fault intersections occur but that subhorizontal intersections are more common. Therefore, it is most likely that σ_1 was steep and σ_2 subhorizontal. If this is correct, faulting may have occurred in the cool border phase rocks as a result of forces caused by upward movement of magma, during emplacement of younger phases of the batholith.

Later subhorizontal faults are apparently the result of a new stress system, with σ_1 and σ_2 inclined at low angles and the minimum principal stress (σ_3) inclined steeply. The orientation of the stress ellipsoid is uncertain in this instance because the attitudes of the faults could not be measured accurately.

Mineralization

Commonly, copper mineralization occurs in veins with quartz, chlorite, amphibole, calcite, magnetite, and epidote. It may also occur in veins with one or more of these components missing or in veins containing pyrite and (or) hematite. Most of the copper-magnetite-bearing veins occur in easterly striking fault zones. In diamond-drill hole 3, veins were commonly less than 1 inch wide and several feet apart; in diamond-drill hole 6, veins were more than 10 feet apart. Core from drill holes 1 and 2 was not available and hole 5 was lost in overburden. Virtually no copper mineralization was seen in hole 4. Where mineralization occurred in the drill holes, visual estimates of grade seldom reached 1 per cent copper and never for more than a few feet. Near the old workings, major faults with gouge zones up to 40 feet wide but typically near 10 feet occur approximately every 125 feet. Many do not contain copper mineralization but in those which have it, veined zones are commonly 3 to 4 feet wide and locally range up to 12 feet wide. Visual estimates suggest grades of less than 1 per cent copper in typical veined zones.

WORK DONE: Seven diamond-drill holes tested mineralization exposed by road-building and targets delineated by the ground magnetometer survey done in 1969.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 249; Albee, A. L., *American Mineralogist*, 1962, Vol. 47, pp. 851–870; Northcote, K. E., *B.C. Dept. of Mines & Pet. Res.*, Bull. 56, 1969.

CHATAWAY (No. 5, Fig. J)

LOCATION: Lat. 50°22′ Long. 120°53′ (92I/7W)

See report on this property, page 371.

CHIEF, GEO (No. 10, Fig. J)

LOCATION: Lat. 50°44.5′ Long. 121°02′ (92I/11E)

At approximately 2,000 feet elevation, from three-quarters to 2¾ miles southwest of Walhachin.

CLAIMS: Fifty-six CHIEF and GEO.

ACCESS: By road from Walhachin, 2 miles.

OWNER: SUPERTEST INVESTMENTS AND PETROLEUM LIMITED, 640 Eighth Avenue SW., Calgary 2, Alta.

METALS: Silver, copper, zinc.

DESCRIPTION: It is reported that the Nicola-Cache Creek contact trends northwest across the property. The Nicola Group consists of basic volcanic rock, the Cache Creek of intermediate volcanic rock with limestone interbeds. Apparently these are crosscut by granitic rocks of the Guichon Creek Batholith. The edge of the granites trends north to northeast as it is followed northward across the property. Tertiary lavas and conglomerates form outliers and cap the older rocks on the southeast part of the property. Mineralization occurs in contact metamorphosed limestone of the Cache Creek Group near the contact with intrusive rocks of the Guichon Creek Batholith.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet (plotting, 1 inch equals 200 feet) on Chief 2, 4, 14, 25 to 32, 35 to 38, 43, 45, and Geo 57 to 62; induced polarization survey, 12 line-miles covering Chief 1, 2, 4, 14, 21 to 27, 35 to 42, and Geo 57, 59 to 62; road construction, 1 mile on Chief 6, 8, 23, 25, and Geo 60, 62; surface diamond drilling, three holes totalling 754 feet on Geo 60 and 62. A pulse-type induced polarization survey was conducted with stations spaced 200 feet on east-west lines 400 feet apart. Electrode spacing was 400 feet generally, but 50, 100, and 200 feet in areas of interest.

REFERENCES: Assessment Reports 2476, 2772, 2773.

COWBIRD, DS (No. 40, Fig. J)

LOCATION: Lat. 50°28′ Long. 121°12′ (92I/6E)

West of Calling Lake and north of Pimainus Creek, at elevation 4,800 feet.

CLAIMS: COWBIRD 1 to 6, DS 1 to 10.

ACCESS: From Spences Bridge by road, 2 miles along the east bank of the Thompson River and then 12 miles along the north side of Pimainus Creek.

OPERATOR: LARGO MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

DESCRIPTION: Outcrops are scarce, but the claims are apparently underlain by quartz diorites of the Hybrid phase of the Guichon Creek Batholith. An easterly trending shear zone about 60 feet wide, which is crossed by several old trenches, is mineralized with hematite, pyrite, and chalcopyrite.

WORK DONE: East-west lines were cut 500 feet apart. A total of 8.47 line-miles was cut and 428 soil samples were collected. The property was geologically mapped at 1 inch equals 500 feet scale on a reconnaissance basis. Three line-miles of induced polarization, 1 line-mile of detailed induced polarization, and 3 line-miles of magnetometer surveying were done on Cowbird 1 to 6. Pulse-type induced polarization methods were employed with electrode spacing 400 feet in reconnaissance areas and 200 feet in areas of detailed coverage.

REFERENCES: Assessment Reports 2395, 2682.

DEB (No. 9, Fig. J)

LOCATION: Lat. 50°32′ Long. 120°53′ (92I/10W)
At approximately 4,000 feet elevation, west of Guichon Creek, about 5 miles south of Tunkwa Lake.

CLAIMS: DEB 1 to 24.

ACCESS: By the Tunkwa Lake road from Savona, 20 miles.

OWNER: VICTOR MINING CORPORATION LTD., 818, 510 West Hastings Street, Vancouver 2.

METAL: Copper.

DESCRIPTION: Underlain by border phase rocks of the Guichon Creek Batholith and Nicola volcanic rocks.

WORK DONE: Surface workings surveyed; geochemical survey, 191 samples; trenching, 3,500 feet on Deb 5 and 18.

DO, GO (No. 56, Fig. J)

LOCATION: Lat. 50°32.5′ Long. 121°04.25′ (92I/11E)
North of the Highland Valley highway and southeast of Cinder Hill, at elevations 4,000 to 4,700 feet.

CLAIMS: DO 5 to 7, GO 31 to 36.

ACCESS: From Ashcroft 23 miles via the Highland Valley highway.

OWNER: Cadco Enterprises Ltd.

OPERATOR: LORNEX MINING CORPORATION LTD., 202, 580 Granville Street, Vancouver 2.

WORK DONE: A pulse-type induced polarization survey was conducted at 100-foot stations along lines oriented north 70 degrees east at 400-foot intervals. A three-electrode array with spacing 200 feet was employed. Six line-miles was done.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 253; Assessment Report 2686.

DON, KEN (No. 42, Fig. J)

LOCATION: Lat. 50°24–26′ Long. 121°13–15′ (92I/6E)
Southeast of Pimainus Creek, at elevation 3,500 to 5,000 feet.

CLAIMS: DON 1 to 131; KEN 1 to 24; RWS 1, 2; PAT 8, 10, 12, 14, 16, 18, 20, 32, 34, 36, 38, 49.

ACCESS: From Ashcroft via Highland Valley highway and the Calling Lake–Pimainus Lake road.

OWNER: LARGO MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

WORK DONE: A reconnaissance soil-sampling survey was conducted. Samples were taken at 100-foot intervals along east-west grid-lines 2,800 feet apart. Claims crossed by the survey were Don 1 to 44, 51 to 76, 93 to 96, 108 to 115, and Ken 3, 5, 11 to 24.

REFERENCE: Assessment Report 2396.

DONNA (No. 45, Fig. J)

LOCATION: Lat. 50°36.5′ Long. 120°53′ (92I/10W)
West of Tunkwa Lake.

CLAIMS: DONNA 1 to 4.

ACCESS: From Savona along the Tunkwa Lake road.

Owner: NORTH BAY MINES & OILS LTD., 198 West Hastings Street, Vancouver 3.

Description: Only andesite float, no outcrop, was found.

Work done: Cross-lines spaced 300 feet were cut from a north-south base-line. Stations were flagged at 200-foot intervals. One hundred and nineteen soil samples were taken.

Reference: Assessment Report 2420.

DS, PAT (No. 34, Fig. J)

Location: Lat. 50°26.5–27′ Long. 121°12–14′ (92I/6E)
Mostly north and northeast of Pimainus Creek.

Claims: DS 11 to 26, 29 to 36; PAT 9, 11, 13, 15, 17, 19, 31, 33, 35, 37, 40 to 43.

Access: A turnoff 2 miles east of Spences Bridge on the east side of the Thompson River leads 12 miles along the north side of Pimainus Creek to the claims.

Owner: LARGO MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

Work done: One thousand and nine soil samples were taken at 100-foot intervals along east-west lines 500 feet apart.

Reference: Assessment Report 2358.

ED (No. 1, Fig. J)

Location: Lat. 50°34–36′ Long. 121°07–10′ (92I/11E)
North slope of the Highland Valley from the highway up the fire-access road in the drainage area of Woods Creek, at an elevation of 4,500 feet.

Claims: ED 13 to 16, 25 to 28, 42 to 48, 55 to 78, 80.

Access: By road from Ashcroft a distance of 17 miles, then 2 miles up the fire-access road.

Owner: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

Description: The claims cover an area which contains the contact between the Hybrid phase and the Guichon variety of the Guichon Creek Batholith.

Work done: Surface geological mapping, 1 inch equals 1,000 feet; geochemical soil survey, 830 samples on 34 ED claims.

References: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 251; Assessment Reports 1740, 2631.

FEED (No. 32, Fig. J)

Location: Lat. 50°33′ Long. 121°04.5′ (92I/11E)
Northwest of Burr Creek and southeast of Cinder Hill.

Claims: FEED 11 to 32.

Access: From the Highland Valley highway northward along the dirt access road which joins the highway 18 miles from Ashcroft.

Owner: JUMBO MINES LTD., 617, 402 West Pender Street, Vancouver 3.

Description: In an area of very sparse outcrop but probably underlain by granodiorite of the Bethlehem phase of the Guichon Creek Batholith and outliers of Kamloops volcanic rock.

Work done: North-south lines were cut 400 feet apart on claims Feed 15 to 22, 25, 27 to 29, 31, and 32. A ground magnetometer survey was conducted along 11 line-miles, with 50 stations to a mile on claims Feed 15 to 18, 25, 27, 28, 31, and 32.

Reference: Assessment Report 2279.

FEED (No. 64, Fig. J)

Location: Lat. 50°33′ Long. 121°05′ (92I/11E)
Southeast corner of Cinder Hill, at elevation 4,400 to 5,100 feet.

Claims: FEED 15 to 20, 22 to 25, 27, 29 to 35.

Access: A two-wheel-drive dirt road which leaves the Highland Valley highway about 20 miles from Ashcroft passes through the claims.

Owner: JUMBO MINES LTD., 617, 402 West Pender Street, Vancouver 3.

Description: Underlain in part by granodiorites of the Bethlehem phase of the Guichon Creek Batholith and several(?) outliers of Kamloops volcanic rocks. Outcrop is very sparse.

Work done: A very low frequency electromagnetic survey of 10 line-miles was carried out on claims Feed 16 to 22, 27 to 29, 31, and 32. The survey was run on a grid used for an earlier magnetometer survey. The northeast-southwest lines are 500 feet and stations are 100 feet apart.

References: Assessment Reports 2279, 2831.

FU (No. 46, Fig. J)

Location: Lat. 50°42.5′ Long. 121°14′ (92I/11E)
Claims straddle Barnes Lake.

Access: From Ashcroft 4 miles along Highland Valley highway, then along the Barnes Lake road.

Owner: NORTH BAY MINES & OILS LTD., 198 West Hastings, Vancouver 3.

Description: Only volcanic float was found.

Work done: Three hundred and seventeen soil samples were taken at 300-foot centres along east-west lines 300 feet apart.

Reference: Assessment Report 2452.

HIGH (No. 22, Fig. J)

Location: Lat. 50°35.5–38′ Long. 120°51–56′ (92I/10W)
West of Tunkwa Lake.

Claims: HIGH 1 to 100.

Access: From Savona via Tunkwa Lake road.

Owners: Arlington Silver Mines Ltd. and Largo Mines Ltd.

Operator: PHELPS DODGE CORPORATION OF CANADA, LIMITED, 404, 1112 West Pender Street, Vancouver 1.

Description: Underlain by Kamloops volcanic rocks which are underlain and in part interlayered with clay shales and conglomerates which may correlate with the Coldwater series. Three holes were drilled. Hole 1, which was collared at 40N, 28W and inclined minus 90 degrees, passed through 79 feet of overburden, Kamloops lavas to 107 feet, clay shale to 217 feet, then conglomeratic clay shale to 370 feet. Hole 2, which was collared at 40N, 4W and inclined minus 50 degrees to the east, passed through 50 feet of overburden, Kamloops lavas to 200 feet, clay shale and clay shale breccia to 417 feet, then conglomeratic clay shale to 468 feet. Hole 3, which was collared at 40N, 1E and inclined minus 90 degrees, passed through 36 feet of overburden, Kamloops lavas to 137 feet, clay shale to 387 feet, vesicular lava which graded to massive lava by 402 feet and continued to 430 feet, clay shale and conglomerate to 600 feet, clay shale with several lava interlayers to 650 feet, then clay shale to 700 feet. No mineralization was encountered to account for the induced polarization anomalies.

WORK DONE: An induced polarization survey along east-west lines 400 feet apart was made by the dipole-dipole method. Stations were spaced 200 feet, X=200 and n = 1, 2, 3, 4, and 5. Three diamond-drill holes tested anomalous areas.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 254; Assessment Reports 2142, 2774, 2775.

HUNT (No. 58, Fig. J)

LOCATION: Lat. 50°28′ Long. 120°47′ (92I/7W)
Two miles south-southeast of Logan Lake, at elevations of 3,500 to 4,000 feet.

CLAIMS: HUNT 7 to 14, 19 to 24.

ACCESS: From Merritt–Spences Bridge highway along Mamit Lake road.

OWNER: GRENMAC SILVER MINES LIMITED, 448 Seymour Street, Vancouver 2.

WORK DONE: Electromagnetic readings were taken on 100-foot stations on east-west lines approximately 500 feet apart. About 15 line-miles was surveyed.

REFERENCE: Assessment Report 2760.

HY (No. 63, Fig. J)

LOCATION: Lat. 50°40.5–41.5′ Long. 121°10–11′ (92I/11E)
50°38.75–40′
Two areas, one west of the head of Studhorse Creek, 1½ miles northwest of the peak of Glossy Mountain (HY 1 to 21), and one 3½ miles north-northwest of the peak (HY 22 to 49).

CLAIMS: HY 1 to 49.

ACCESS: From the Highland Valley highway along four-wheel-drive roads which traverse the southwest slope of Glossy Mountain.

OWNERS: EAGLE BAY MINES LTD., 414, 402 West Pender Street, Vancouver 1 (HY 22 to 49), and GIBBEX MINES LTD., 210, 325 Howe Street, Vancouver 1 (HY 1 to 21).

DESCRIPTION: Predominantly underlain by Kamloops volcanic rocks with a few inliers of intrusive rock of the Guichon Creek Batholith. The inliers are sizeable at the west edge of the property.

WORK DONE: An electromagnetic survey was run for 11.3 line-miles over the HY 35 to 45 claims along east-west lines 400 feet apart. Station spacing was 100 feet. Magnetometer readings were taken on 100-foot stations along east-west lines spaced 400 feet on HY 1 to 21.

REFERENCES: Assessment Reports 2825, 2830.

HY (No. 7, Fig. J)

LOCATION: Lat. 50°40′ Long. 121°11′ (92I/11E)
At approximately 3,200 feet elevation on the northwest slope of Glossy Mountain.

CLAIMS: HY 50 to 64.

ACCESS: By Highland Valley highway and gravel road past Barnes Lake from Ashcroft, 15 miles.

OWNER: Q.C. EXPLORATIONS LTD., 201, 535 Howe Street, Vancouver 1.

DESCRIPTION: The property is underlain by intrusive rocks of the Guichon Creek Batholith.

WORK DONE: Geochemical survey, 400 samples.

JC (No. 12, Fig. J)

LOCATION: Lat. 50°23′ Long. 121°06′ (92I/6E)
In Highland Valley, 1.8 miles south of Pimainus Lake, at approximately 5,000 feet elevation.

CLAIMS: Eleven JC claims.

ACCESS: By road from Spences Bridge, 14 miles.

OWNER: SILVERLINE MINES LTD., 400, 1055 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Blebs and stringers of bornite occur in an altered Hybrid phase of the Guichon Creek Batholith. Alteration consists of chlorite and epidote.

WORK DONE: Chip sampling.

REFERENCE: Assessment Report 2385.

JEAN, GRO, ROG, WOW (No. 33, Fig. J)

LOCATION: Lat. 50°32′ Long. 120°51′ (92I/10W)
The claims are along the west side of the Tunkwa Lake road from a mile north of the Four Corners to east of Big Meadow Lake, at elevation 3,500 feet.

CLAIMS: JEAN 1 to 16, GRO 1 to 18, ROG 1 to 21, WOW 1 to 16.

ACCESS: From Ashcroft, 34 miles via the Highland Valley highway and Tunkwa Lake road, or from Savona via Tunkwa Lake road.

OWNER: ALTEX MINES LTD., 575 Howe Street, Vancouver 1.

DESCRIPTION: The claims lie along the east flank of the Guichon Creek Batholith and are underlain by Triassic volcanic rocks of the Nicola Group and Tertiary volcanic rocks.

WORK DONE: East-west lines were cut 800 feet apart along a north-south base-line (the natural gas pipe-line). Samples were collected 200 feet apart on the lines; 1,020 samples were collected along 38.2 line-miles.

REFERENCE: Assessment Report 2312.

JERICHO (No. 59, Fig. J)

LOCATION: Lat. 50°28–28.5′ Long. 120°50.5–51.5′ (92I/7W)
South of Witches Brook and southwest of Indian Reserve 15, about 7 miles east of Quiltanton (Divide) Lake.

CLAIMS: JERICHO 2, 4, 6, 8, 10.

ACCESS: From Ashcroft via Highland Valley highway and Billy Lake–Chataway Lake road.

OWNER: J. R. MEIKLE, Box 552, Station A, Vancouver 1.

WORK DONE: An infinite source electromagnetic survey was made on four northeast-southwest lines 400 feet apart, with station spacing set at approximately 100 feet.

REFERENCE: Assessment Report 2795.

JOE, BET (No. 70, Fig. J)

LOCATION: Lat. 50°28′ Long. 120°56′ (92I/7W)
At 4,000 to 4,400 feet elevation, in a strip extending from south of Indian Reserve 14 to north of Indian Reserve 15.

CLAIMS: BET 1 to 6, JOE 1 to 6, 7 and 8 Fractions.

ACCESS: By road from Ashcroft, 28 miles southeast.

OWNER: HIGHLAND VALLEY MINES LTD., 551 Howe Street, Vancouver 1.
METAL: Copper.
DESCRIPTION: Rock exposed only on three claims, remaining claims covered by overburden.
WORK DONE: Surface diamond drilling, one hole totalling 383 feet on Joe claim.
REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 256.

KELLY, PAT, FOX (No. 44, Fig. J)

LOCATION: Lat. 50°33–35.5′ Long. 121°11–13′ (92I/11E)
North of Pukaist Creek at elevation 3,700 to 4,700 feet.
CLAIMS: KELLY 7, 8, WREN 1 to 20, FOX 1 to 12, PAT 1 to 14, WIN 1 to 6, DALE 1 to 6, ACE 1 to 13 Fractions.
ACCESS: The Highland Valley highway crosses the claims 12 miles from Ashcroft.
OWNER: TRUMPETER MINES LTD., 1403, 1030 West Georgia Street, Vancouver 5.
DESCRIPTION: The property is underlain by rocks of the Hybrid phase of the Lower Jurassic Guichon Creek Batholith and volcanic rocks of the Tertiary Kamloops Group.
WORK DONE: A grid was cut with cross-lines at 400-foot intervals along a north-south base-line. Stations were flagged every hundred feet along the cross-lines. Topographic and magnetic readings and a soil sample were taken at each of the 3,297 stations.
REFERENCES: Assessment Reports 1806, 1853, 2416.

LAKE, LAKEN, PM, PIM (No. 38, Fig. J)

LOCATION: Lat. 50°25.5′ Long. 121°06.5′ (92I/6E)
At approximately 5,000 feet elevation, north, south, and west of the west end of Pimainus Lake.
CLAIMS: LAKE 1 to 10; LAKEN 1 to 16; PM 1 to 6; PIM 1, 2 Fractions; PIM 7 to 20; SNO 1 to 9; IL 1, 2 Fractions; IL 3 to 6; PLES 1 to 3 Fractions; SPOT 1, 2; OVERSIGHT 1, 2.
ACCESS: From Highland Valley highway by road, 10 miles.
OWNER: T.C. Explorations Ltd. (now Decca Resources Limited).
OPERATOR: KEEVIL MINING GROUP LIMITED, 108, 627 Sixth Avenue SW., Calgary 1, Alta.
METALS: Copper, molybdenum.
DESCRIPTION: Epidote, sericite, chlorite, and hematite alteration is widespread and locally intense. Malachite and bornite occur in quartz-sericite-hematite veins in Bethsaida granodiorite. Epidote veining is locally intense in Hybrid phase rocks. All phases of the Guichon Creek Batholith crop out on the property.
WORK DONE: Surface geological mapping, 1 inch equals 400 feet on all claims.
REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1968, p. 192; Assessment Report 2793.

LEM (No. 53, Fig. J)

LOCATION: Lat. 50°24.5′ Long. 120°57′ (92I/7W)
North of Roscoe Lake and covers Deer Lake.
CLAIMS: LEM 73 to 80; LEM 11, 12 Fractions.
ACCESS: From Ashcroft or Spences Bridge to Chataway Lodge, then along the Roscoe Lake road.

Owner: KELVER MINES LTD., 1710A, One Bentall Centre, Vancouver 1.
Metal: Copper.

Description: The property is underlain by granodiorite of the Bethlehem phase of the Guichon Creek Batholith, which is cut by aplite and quartz porphyry dykes. Sparse chalcopyrite mineralization was found in the dumps of several trenches. It occurs in fractures in altered granodiorite apparently in close proximity to dykes.

Work done: Previous work done on the property includes numerous trenches and at least four diamond-drill holes. A pulse-type induced polarization survey was carried out on east-west lines which were cut at 400-foot intervals on Lem 79 and 80 and 12 Fraction. Electrode spacings used were 200, 400, and 800 feet. Station intervals were 200 feet.

References: Assessment Reports 2579, 2628.

LORN, FLY, SNOW, MIJ (No. 48, Fig. J)

Location: Lat. 50°31–32′ Long. 121°04–08′ (92I/11E)
The claims straddle the Highland Valley highway at elevation 4,200 feet.
Claims: LORN, SNOW, FLY, MIJ, GT, JES, NIM, etc. (tailings area).
Access: Twenty-three miles from Ashcroft along Highland Valley highway.
Owner: LORNEX MINING CORPORATION LTD., 202, 580 Granville Street, Vancouver 2.

Description: Underlain primarily by granodiorites of the Chataway phase of the Guichon Creek Batholith which are cut by numerous porphyritic dykes (Witches Brook phase, Northcote, 1969, or perhaps Bethlehem phase).

Work done: An induced polarization survey was made along east-northeast grid-lines 600 feet apart. Approximately 40 line-miles was covered, using pulse-type equipment with 400 and 800-foot electrode spacing.

References: Northcote, K. E., *B.C. Dept. of Mines & Pet. Res.*, Bull. 56, 1969, p. 73; Assessment Report 2489.

LORNA, MAT, PAM, JON (No. 57, Fig. J)

Location: Lat. 50°25–26′ Long. 121°07–10′ (92I/6E)
Three miles south-southwest of Calling Lake, at elevation 5,000 feet.
Claims: Thirty-nine LORNA, 26 MAT, 31 PAM, 16 JON.
Access: From the Highland Valley highway via the OK (Alwin) road past Calling Lake.

Owners: Zenith Mining Corporation Ltd. and Mollie Mac Mines Ltd.

Operator: THE DOWA MINING CO., LTD., 1102, 1111 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Two main joint directions are described 000 degrees to 010 degrees and 090 degrees to 110 degrees; both sets are subvertical. Joints are best developed near faults and tend to be subparallel to the faults. Major faults described trend 060 degrees, 085 degrees, 175 degrees, and 165 degrees. Alteration, epidote veining, and traces of malachite, bornite, and chalcopyrite are associated with the faults. Virtually all the phases of the Guichon Creek Batholith outcrop on the property.

Work done: The property was geologically mapped at 1 inch equals 400 feet scale. A previously cut grid-line was used for control. A ground magnetometer survey was conducted at 100-foot intervals along the east-west grid-lines. Hammer seismic data were collected at 60 stations along 10 traverse-lines in the northern part of the property.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 260; Assessment Report 2700.

LORNEX (No. 28, Fig. J)

By E. Sadar

Location: Lat. 50°28′ Long. 121°01′ (92I/6E)
In Highland Valley, 2 miles south of Quiltanton Lake.

Claims: Company owns 97 mineral leases and 85 claims.

Access: Twenty-six miles southeast of Ashcroft along the Highland Valley highway, an improved gravel road leads 2 miles southward to the property.

Owner: LORNEX MINING CORPORATION LTD., 465 Victoria Street, Kamloops.

Metals: Copper, molybdenum.

Work done: Approximately 4½ million tons of overburden was removed from the open-pit area during 1970. Construction of mine plant facilities began under the principal contractor, Stearns-Rogers Canada Limited. Fifteen thousand five hundred and thirty feet of 336 M.C.M. overhead power-line was installed for the pit operation. It consists of two parallel 4,160-volt circuits fed from a 5,000-kva. 13,800–4,160-volt transformer. A temporary distribution system was installed to supply a construction camp during construction of the mill and service buildings. Approximately 160 persons were on the Lornex payroll in December 1970. Stearns-Rogers employed approximately 450 people in construction.

References: *Minister of Mines, B.C.*, Ann. Repts., 1966, pp. 155–158; 1967, pp. 157, 158; 1968, p. 187; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 260.

MAN (No. 65, Fig. J)

Location: Lat. 50°35′ Long. 121°16′ (92I/11W)
Between 3,000 and 4,000 feet elevation, 2 miles south of Basque and east of Spatsum.

Claims: MAN 1 to 61.

Access: A dirt road 3½ miles from Ashcroft on the Highland Valley highway leads to the property.

Operator: MANTLE MINERALS LTD.

Metal: Copper.

Description: Most of the outcrop is in a north-south belt where the slope is steep; no outcrop is exposed from the west central part of the claims down to the Thompson River. The southwest corner of the group is underlain by greenstone or greywacke of the Cache Creek Group. The northwest corner is underlain by rocks of the Nicola Group. The rocks are intruded by a quartz monzonite stock (the Spatsum granite) in the south and north central part of the claims. Gossan is exposed along the west edge of the outcrop area. Where gossan crosses quartz porphyry, the porphyry contains specks of pyrite and chalcopyrite.

Work done: Two areas, Man 27 to 32 and 1 to 26, were worked on. A geochemical survey was run along 30 line-miles of east-west lines and 650 samples taken at 200-foot intervals. A reconnaissance geological survey was conducted.

Reference: Assessment Report 2840.

MB (No. 51, Fig. J)

Location: Lat. 50°34′ Long. 121°06.5′ (92I/11E)
The claims are east of Woods Creek and west of Cinder Hill, at elevation 4,600 to 5,000 feet.

Claims: MB.

Access: A dirt fire-access road leads from the Highland Valley highway to the property. The turnoff is 17 miles from Ashcroft.

Owner: CROYDON MINES LTD., 27th Floor, 1177 West Hastings Street, Vancouver 1.

Work done: Soil samples were taken from 200-foot stations which were established on east-west lines at 400-foot intervals. Threshold values differ in areas presumed to be underlain by volcanic rocks from those in areas presumed to be underlain by granitic rocks.

Reference: Assessment Report 2490.

MEL (No. 24, Fig. J)

Location: Lat. 50°23.5′ Long. 121°10.5′ (92I/6E)
The property straddles Kloklowuck Creek, northeast of Clapperton and north of Indian Reserve 12, at an elevation of approximately 4,500 feet.

Claims: MEL 1 to 16.

Access: From Spences Bridge by the Skuhun and Papsilqua Creeks roads, 14 miles.

Owner: ANGLO-BOMARC MINES LTD., 301, 540 Burrard Street, Vancouver 1.

Description: Probably underlain by granitic rocks of the Hybrid phase of the Guichon Creek Batholith and volcanic rocks of the Tertiary Spences Bridge Group.

Work done: Geochemical survey, 153 samples covering Mel 1 to 16.

Reference: Assessment Report 2575.

NAT, GAP, FARGO (No. 68, Fig. J)

Location: Lat. 50°26′ Long. 120°55′ (92I/7W)
At approximately 4,500 feet elevation, west-northwest of Billy Lake.

Claims: NAT, GAP, FARGO, BUD, totalling 37.

Access: From the Highland Valley highway via Billy Lake road, 8 miles.

Owner: Gaza Mines Ltd.

Operator: TREMAR MINERALS LIMITED, 12, 425 Howe Street, Vancouver 1.

Metal: Copper.

Description: Area of contact between Bethlehem and Guichon phases of the Guichon Creek Batholith. Chalcopyrite and bornite in kaolinized shear zone in granodiorite.

Work done: Percussion drilling, 11 holes totalling 3,450 feet on Gap 1 and 2.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 253.

NIM (No. 49, Fig. J)

Location: Lat. 50°32′ Long. 121°07′ (92I/11E)
East of Jim Black Lake and north of Jac Lake, at elevation 4,500 to 4,800 feet.

Claims: NIM 1 to 22.

Access: An unimproved road leads south from the Highland Valley highway to the property.

OWNER: New Indian Mines Ltd.

OPERATOR: LORNEX MINING CORPORATION LTD., 202, 580 Granville Street, Vancouver 2.

WORK DONE: North-south grid-lines were cut at 400-foot intervals. Over claims NIM 1 to 4 northeast-southwest lines were also cut at 600-foot intervals. A pulse-type induced polarization survey with stations 200 feet apart was run over all the lines, with electrode spacings of 200, 400, and 800 feet.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 262; Assessment Report 2456.

NITE (No. 60, Fig. J)

LOCATION: Lat. 50°19′ Long. 121°05.5′ (92I/6E)

Approximately 9 miles northwest of the Craigmont mine and 2 miles northeast of the Nicola River, at 3,000 to 5,000 feet elevation.

CLAIMS: NITE 1 to 16.

ACCESS: From Merritt–Spences Bridge highway along two-wheel-drive road up Skuhun Creek and a four-wheel-drive road which leads up the south flank of Skwilkwakwil Mountain.

OWNER: NORTH BAY MINES & OILS LTD., 414, 198 West Hastings Street, Vancouver 3.

DESCRIPTION: Underlain by Chataway phase of Guichon Creek Batholith. There are few outcrops.

WORK DONE: Two hundred and thirty-one soil samples were taken at 300-foot intervals along north-south lines spaced 400 feet apart.

REFERENCE: Assessment Report 2761.

OK (Alwin) (No. 4, Fig. J)

By David Smith

LOCATION: Lat. 50°29′ Long. 121°06′ (92I/6E)

At approximately 5,400 feet elevation, 3 miles west-southwest of Quiltanton (Divide) Lake.

CLAIMS: OK (Lot 3644); APEX (Lot 3645); IOU (Lot 3643); EZZ 12, 14, 19 to 22; OK 5 to 10; PAL 1, PAL 1 to 3 Fractions; CALL 1 to 4; ALWIN 1, 2 Fractions; FB 1 Fraction.

ACCESS: By highway, 25 miles from Ashcroft and then 5 miles of gravel road.

OWNER: ALWIN MINING CO. LTD., 807, 409 Granville Street, Vancouver 2.

METALS: Copper, silver.

DESCRIPTION: Chalcopyrite-bornite, minor chalcocite; probably replacement of steep shear zones striking 080 degrees and 110 degrees. Host rock Bethsaida granodiorite phase of the Guichon Creek Batholith. After dilution, reserves for the deposit are estimated to be 1,369,600 tons, assaying 2.04 per cent copper.

WORK DONE: Surveying for feasibility report on water supply, plant layout, etc.; surface geological mapping, 1 inch equals 300 feet on all claims; trenching, 600 feet on Apex (Lot 3645). A mine ventilating fan and a pump each driven by a 15-horsepower motor were used in the mine. A 125-kva. diesel-electric generating unit supplies power.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 262.

PANTHER, SARAH (No. 27, Fig. J)

Location: Lat. 50°24′ Long. 120°56′ (92I/7W)
At approximately 5,100 feet elevation, 1 mile east of Roscoe Lake.
Claims: PANTHER 37 to 40, SARAH 1 Fraction.
Access: From Ashcroft by the Highland Valley highway, then the Billy and Roscoe Lakes roads, about 35 miles.
Operator: KELVER MINES LTD., 1710A, One Bentall Centre, Vancouver 1.
Metal: Copper.
Description: The property is apparently crossed by the contact between rocks of the Bethlehem and Chataway phases of the Guichon Creek Batholith.
Work done: Claims and surface workings mapped; surface geological mapping, 1 inch equals 400 feet; and ground magnetometer survey, approximately 1.5 line-miles covering Panther 37 to 40 and Sarah 1 Fraction.
Reference: Assessment Report 2630.

PH, CT (No. 31, Fig. J)

Location: Lat. 50°15′ Long. 121°01′ (92I/3E, 6E)
Claims straddle Gordon Creek, west of Gordon Lake and north of Indian Reserve 9.
Claims: PH 1 to 54, CT 1 to 50.
Access: From the Merritt–Spences Bridge highway via the unimproved dirt road up Gordon Creek.
Owner: ALBERT A. ABLETT.
Work done: East-west lines were cut at 500-foot spacing on the northern one-third and southern one-third of the claim group.
Reference: Assessment Report 2270 (line-cutting).

PI (No. 29, Fig. J)

Location: Lat. 50°29′ Long. 121°13.7′ (92I/6E)
50°27.5′ 121°14′
West of Calling Lake, at elevation 3,500 feet.
Claims: PI 28, 29, 31, 33, 45 to 57, 59, 60 (includes the old Toketic showing).
Access: From Spences Bridge northward along an unimproved dirt road along the east side of the Thompson River.
Owner: TOWER MINES LTD. (now Tower Resources Ltd.), 305, 540 Burrard Street, Vancouver 1.
Metal: Copper.
Description: Specular hematite and minor chalcopyrite fill fractures in rocks of the Hybrid phase of the Guichon Creek Batholith.
Work done: Induced polarization surveys were done in two areas. Grid one consists of 3 line-miles with east-west lines 500 feet apart. Grid two consists of 11 line-miles with north 20 degrees west lines 400 feet apart.
References: Assessment Report 2244; *Geol. Surv., Canada,* Mem. 262, Ashcroft Map-Area, p. 122.

PRICE (No. 41, Fig. J)

Location: Lat. 50°24.5′ Long. 120°56.5′ (92I/7W)
Northeast of Roscoe Lake, at elevation 5,000 feet.
Claims: PRICE 31, 33 to 38, RUBY 20 and 21 Fractions.

Access: From Ashcroft or Spences Bridge to Chataway Lodge, then along the Roscoe Lake road.

Owner: PATHFINDER RESOURCES LTD., 201, 714 West Hastings Street, Vancouver 1.

Work done: A magnetometer survey was run on the Price 35 to 38 and Ruby 21 Fraction. East-west lines were cut at 400-foot intervals and stations established every 200 feet along them. About 4½ line-miles was cut.

Reference: Assessment Report 2361.

PYRITE, MAY, MUD (No. 14, Fig. J)

Location: Lat. 50°43–45′ Long. 121°09–14′ (92I/11E)
At approximately 2,000 feet elevation, 5 miles east of Ashcroft on both sides of the Thompson River.

Claims: PYRITE 1 to 40, MAY 1 to 50, MUD 1 to 11.

Access: From Ashcroft via the Highland Valley highway and the road past Barnes Lake.

Operator: PLACID OIL COMPANY, 860 Guiness House, Calgary 2, Alta.

Metal: Copper.

Description: North of river—Nicola volcanics intruded by marginal phases of the Guichon Creek Batholith. South of river—Kamloops volcanics overlying phases of Guichon Creek Batholith.

Work done: Surface geological mapping, 1 inch equals 200 feet on Pyrite 1, 4 to 7, 13 to 16, 20, 23, 25 to 36, and May 4, 6, 39, 40; induced polarization survey, 6 line-miles covering Pyrite 25 to 30; geochemical soil survey, 900 samples covering Pyrite 3, 4, 16, 18, and May 39, 40; surface diamond drilling, three holes totalling 900 feet on Pyrite 16 and May 6.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 263; Assessment Report 2259.

RAF, TAM (No. 50, Fig. J)

Location: Lat. 50°31′ Long. 121°05.5′ (92I/11E)
At elevations of 4,000 to 5,500 feet, west of Indian Reserve 12 and north of Island Lake.

Claims: RAF 1 to 10, 12, 18 to 20; TAM 1 to 20.

Access: The claims are south of the Highland Valley highway, 22 miles from Ashcroft.

Owner: Cleveland Mining & Smelting Co. Ltd.

Operator: LORNEX MINING CORPORATION LTD., 202, 580 Granville Street, Vancouver 2.

Description: Two diamond-drill holes encountered an outlier or plug of Kamloops volcanic rocks.

Work done: On the northeast part of the property, lines were cut at 600-foot intervals off a base-line oriented north 20 degrees west. A pulse-type induced polarization survey, using the three-electrode array with electrode spacings of 400 and 800 feet, was conducted. The main grid has four north-south baselines with cross-lines at 400-foot intervals. Electrode spacings were 200 and 400 feet. Stations were 200 feet apart in both grids.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 264; Assessment Report 2474.

RIV (No. 15, Fig. J)

LOCATION: Lat. 50°30′ Long. 121°13′ (92I/6E, 11E)
At approximately 3,500 feet elevation on Inkikuh Creek, Highland Valley, about 8 miles due west of Divide Lake.

CLAIMS: RIV 1 to 14, 19 to 32, 37 to 50.

ACCESS: By road from Ashcroft, 20 miles.

OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

METAL: Copper.

WORK DONE: Percussion drilling, six holes totalling 1,150 feet on Riv 45 to 48 and 50 claims.

ROYAL (No. 61, Fig. J)

LOCATION: Lat. 50°27.5′ Long. 121°05.5′ (92I/6E)
Straddles Calling Lake, at elevation 5,200 feet.

CLAIMS: ROYAL 2, 4, 6; ROYAL C Fraction.

ACCESS: From Ashcroft via Highland Valley highway and the OK (Alwin) road to Calling Lake.

OWNER: Royal Canadian Ventures Ltd.

OPERATOR: GREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD., 736 Eighth Avenue SW., Calgary 2, Alta.

DESCRIPTION: The property is underlain by granodiorites of the Bethsaida phase of the Guichon Creek Batholith.

WORK DONE: A pulse-type induced polarization survey was conducted on a grid with north-south lines 400 feet apart. Station intervals were 200 feet and three-electrode array, with spacings of 200 and 400 feet employed.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 263; Assessment Report 2800.

ROYAL, LOREX, IL, RC (No. 16, Fig. J)

LOCATION: Lat. 50°24.5–27′ Long. 121°04–05.5′ (92I/6E)
North of Pimainus Lake, south and east of Calling Lake, at elevation 5,000 to 5,500 feet.

CLAIMS: Thirty-three ROYAL, including 21 to 40; LOREX 1 to 40; IL 1, 2; RC 1 to 4.

ACCESS: From Ashcroft via Highland Valley highway and OK (Alwin) road to Pimainus Lake. A four-wheel-drive road from east end of Pimainus Lake leads to the claims.

OWNERS: Royal Canadian Ventures Ltd. and Northlode Explorations Ltd.

OPERATOR: GREAT PLAINS DEVELOPMENT COMPANY OF CANADA, LTD., 736 Eighth Avenue SW., Calgary 2, Alta.

METAL: Copper.

DESCRIPTION: Underlain by granodiorite of the Bethsaida phase of the Guichon Creek Batholith, which is cut by aplite dykes locally. Green sericitic alteration outward from joints is common, but copper mineralization is rarely observed.

WORK DONE: Areas with anomalous induced polarization results were geologically mapped in detail; other areas were mapped on a reconnaissance basis. One thousand five hundred and eighty-one soil samples were collected and magnetometer readings taken every 100 feet along north-south lines 400 feet apart. A dipole-dipole induced polarization survey was done over claims Lorex 1 to 18, 21 to 40, IL 1 and 2, and Royal 21 to 40.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 263; Assessment Reports 2800, 2812, 2813, 2814.

SAGE (No. 35, Fig. J)

LOCATION: Lat. 50°43′ Long. 121°08.5′ (92I/11E)
Between 3,100 and 4,000 feet elevation, 7 miles east of Ashcroft.

CLAIMS: SAGE 3 to 30, 37, 39, 41, 47 to 65, 67, 69, 71.

ACCESS: From Ashcroft along the Highland Valley highway and the Barnes Lake road.

OWNER: LARGO MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

DESCRIPTION: The property is underlain by rocks of the Nicola Group, Guichon Creek Batholith, and Kamloops Group. Outcrop is sparse.

WORK DONE: A magnetometer survey was run along cross-lines from three east-west base-lines. The base-lines are 2,000 feet apart, cross-lines 750 feet apart, and stations 100 feet apart. About 30 line-miles was covered.

REFERENCE: Assessment Report 2341.

SHEBA (No. 19, Fig. J)

LOCATION: Lat. 50°27′ Long. 120°59.5′ (92I/7W)
At elevations of 4,500 to 5,500 feet, mainly on the east and north slopes of Gnawed Mountain.

CLAIMS: SHEBA, CU, LYNN, DAWN, J, JAY, DO, MO, DEE, ANN, CS, JJ, totalling 105.

ACCESS: By road from Ashcroft, 30 miles.

OWNER: SHEBA COPPER MINES LIMITED, 501, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Host rock is Bethlehem quartz diorite and Guichon quartz diorite, with copper mineralization associated with chloritization and potassium feldspar alteration.

WORK DONE: Three miles of old road widened and improved.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 264.

SHORTY (No. 3, Fig. J)

LOCATION: Lat. 50°28′ Long. 121°03′ (92I/6E)
At approximately 4,500 feet elevation, 1 mile southwest of Quiltanton Lake.

CLAIMS: SHORTY 1, 4; Mineral Leases M-120 to M-129.

ACCESS: By road from Highland Valley, 1 mile.

OWNER: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Bethsaida granodiorite with some weak sericitic alteration; weak chalcopyrite and pyrite mineralization.

WORK DONE: Electromagnetic survey, 7.7 line-miles covering Mineral Leases M-121 to M-129; surface diamond drilling, six holes totalling 1,689 feet on Mineral Leases M-124, M-125, M-128, and M-129.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 158 (*see* Calco, Shorty).

TAC (No. 66, Fig. J)

Location: Lat. 50°36–37′ Long. 121°05–08′ (92I/11E)
Between 5,300 and 6,000 feet elevation, at the divide of Woods Creek on the southeast slope of Glossy Mountain.

Access: Four miles from the Highland Valley highway via the fire-access road up Woods Creek.

Operator: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2.

Description: Outcrop density is low. The northern 40 per cent of the property is underlain by Tertiary Kamloops volcanic rocks; the southern 60 per cent by quartz diorite, diorite, and amphibolite of the Early Jurassic Hybrid phase of the Guichon Creek Batholith. At the western edge of the property, a leucocratic member of the Hybrid phase was described which consists mainly of plagioclase with up to 20 per cent mafics or quartz. This rock type may be a leucocratic dyke or perhaps a metasomatized inclusion of siliceous sedimentary rock.

Work done: The cut-line grid was extended to cover the property and soil, magnetometer and geological surveys were conducted. One thousand five hundred and seventy-three soil samples and magnetometer readings were taken at 100-foot intervals along east-west grid-lines 500 feet apart. Twenty-nine and one-half line-miles was completed.

Reference: Assessment Report 2838.

TAM, KEY, MERU, CC (No. 11, Fig. J)

Location: Lat. 50°19–21′ Long. 121°07–09′ (92I/6E)
50°23.5′ 121°07′
Two localities—one south of Pimainus Lakes and west of Spaist Mountain and one north of Skuhun Creek and east of Indian Reserves 12 and 13.

Claims: Two hundred and five, including TAM, KEY, CC, MERU, CHIEF, WHY, A, B, BRAD, KE, BEN, AC, BET.

Access: By Calling Lake road from Highland Valley highway, 10 miles.

Owner: HIGHLAND CHIEF MINES LTD., Suite 1, 558 Howe Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Mineralization occurs as blebs and stringers in the Hybrid phase of the Guichon Creek Batholith. Associated with chlorite-epidote alteration.

Work done: Surface geological mapping, 1 inch equals 1,000 feet on A, B, Ben, CC, and Key; electromagnetic survey, 110 line-miles on same claims; induced polarization survey, 3 line-miles on Key 13, 15, B 13, 15, and CC 14, 16, 18; 5 miles of access roads to drillsites; surface diamond drilling, four holes totalling approximately 1,200 feet on Tam and eight holes totalling approximately 2,000 feet on Tam, Meru, and Why.

References: Assessment Reports 2385, 2613.

TAM, KAM, JAC, RAF (No. 23, Fig. J)

Location: Lat. 50°29.3–31.6′ Long. 121°05–09′ (92I/6E, 11E)
At elevations of 4,000 to 5,500 feet, west of Indian Reserve 12 and north of Island Lake.

Claims: RAF 1, 11 to 17; MER 1 to 40; KAM 13 to 20; GM 1 to 10; JAC 1, 3, 5 to 7, 9 to 22; CLEVE 1 to 3 Fractions.

ACCESS: By the Highland Valley highway and the OK road from Ashcroft, 30 miles.

OWNER: CLEVELAND MINING & SMELTING CO. LTD., 615, 850 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Mainly granodiorite of Bethlehem phase, Chataway variety and Bethsaida phase of the Guichon Creek Batholith, and three small areas of Kamloops volcanics; bornite and chalcopyrite occur in fractures in the granodiorite.

WORK DONE: Induced polarization survey, 33 line-miles covering Raf and Tam claims for Lornex Mining Corporation Ltd.; trenching, 100 feet on Raf 7; surface diamond drilling, four holes totalling 914 feet on Raf 2 and 7 and Mer 6.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 264, 265; Assessment Reports 1837, 2474, 2489, 2602.

TAM, KAM, JAC, RAF (No. 54, Fig. J)

LOCATION: Lat. 50°30.5′ Long. 121°07′ (92I/11E)
At elevations of 4,000 to 5,500 feet west of Indian Reserve 12 and north of Island Lake.

CLAIMS: TAM, KAM, JAC, RAF, etc., totalling 121.

ACCESS: From Ashcroft via Highland Valley highway and a four-wheel-drive road branching off the OK (Alwin) access road.

OWNER: Cleveland Mining & Smelting Co. Ltd.

OPERATOR: CONSOLIDATED GEM EXPLORATIONS LTD., 2002, 1177 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Minor amounts of bornite and chalcopyrite occur at several locations. The most interesting reported is on line 60N a few hundred feet southeast of the base-line, where small amounts of bornite occur in a chlorite-sericite alteration zone in Chataway granodiorite. Field work by the British Columbia Department of Mines and Petroleum Resources indicates that in general the property is underlain by Chataway granodiorite. In a northeast-trending zone through the centre of the property the Chataway is cut by swarms of porphyry dykes. The borders of the dykes may be sharp or gradational; the border of the dyke swarm is gradational. To the west, the Chataway grades into Guichon granodiorite. The contact trends northeast west of Jac Lake but swings to south then southeast at the south end of the property. Two small outliers (plugs?) of Kamloops volcanic rocks were encountered.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 264; Assessment Report 2602.

TAR (No. 55, Fig. J)

LOCATION: Lat. 50°17.5′ Long. 121°05′ (92I/6E)
South of Skuhun Creek, about 4 miles from its confluence with the Nicola River, at elevations of 2,800 to 4,200 feet.

CLAIMS: TAR 13 to 16.

ACCESS: From Merritt–Spences Bridge highway along the Skuhun Creek road and southward through the Wild Horse Society ranch.

OWNER: HIGHLAND VALLEY MINES LTD., 617, 789 West Pender Street, Vancouver 1.

METAL: Copper.

Description: The property is underlain by quartz diorites of the Hybrid phase of the Guichon Creek Batholith which are cut by Tertiary feldspar porphyry dykes. Upslope from the trenches area the Hybrid rocks are overlain by Tertiary lavas of the Spences Bridge Group. Copper mineralization occurs in fractures and shears at several locations on Tar 13 and 14.

Work done: Soil samples were taken at 100-foot intervals along the northwest-trending base-line and along cross-lines cut at 400-foot intervals. About 4 line-miles was covered and 201 soil samples were collected.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 265; Assessment Report 2629.

TIP (No. 39, Fig. J)

Location: Lat. 50°36.5′ Long. 121°08.5′ (92I/11E)
West of Woods Creek on south slope of Glossy Mountain, at elevation 5,000 to 5,800 feet.

Claims: TIP 1 to 12, 17 to 64.

Access: From Ashcroft by the Highland Valley highway and fire-access road, 25 miles.

Owner: GREAT NORTHERN PETROLEUMS AND MINES LTD., 1110, 505 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Hornblende quartz diorite and hornblende diorite within Guichon Creek Batholith of Lower Jurassic age; small part of the property overlain by Kamloops volcanic rocks.

Work done: Surface geological mapping, 1 inch equals 400 feet on Tip 9 to 12, 18, 20, 22, 24 to 40, 50, 52, 54, 56, 58, 60, 62, and 64.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 265; Assessment Report 2025.

TROJAN (No. 21, Fig. J)

Location: Lat. 50°32–33′ Long. 120°59′ to 121°00′ (92I/10W)
At approximately 4,500 feet elevation, northwest of Bose Lake, 18 miles east of Ashcroft.

Claims: Twenty-four Crown grants (BILL, AJ) and 30 located claims, including VENUS, SB, CN, MARS, LIL, MAX, TOM.

Access: By highway and dirt road from Ashcroft, 28 miles.

Operator: PECHINEY DEVELOPMENT LIMITED, 701, 744 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Chalcopyrite and specularite mineralization occur within a breccia body in Guichon quartz diorite. Porphyry dykes are common on the property. Some both crosscut and occur as fragments in the breccia; therefore dyking and brecciation are nearly synchronous.

Work done: Induced polarization survey, 28 line-miles; road construction, 1.5 miles; trenching, 400 feet on Bill 15; surface diamond drilling, three holes totalling 2,500 feet on Max 1, CN 5, and Lil 4 Fraction, and three holes totalling 2,164 feet on Bill 3 and 6; underground diamond drilling, six holes totalling 1,898 feet on Bill 3; percussion drilling, eight holes totalling 1,930 feet on SB 1 and SB Fraction.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 266.

VALLEY COPPER (No. 17, Fig. J)

By W. J. McMillan

Location: Lat. 50°29′ Long. 121°03′ (92I/6E)
Highland Valley, west and southwest of Quiltanton Lake, at approximately 4,000 feet elevation.

Claims: HH, AL, DF, GRR, MD, LTK, totalling 15 claims and 300 claims in three other groups.

Access: On the Highland Valley highway, 25 miles southeast of Ashcroft.

Owner: Valley Copper Mines Limited.

Operator: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

Metals: Copper, molybdenum.

Description:

Acknowledgments

The writer gratefully acknowledges many valuable discussions with, and the co-operation of, Cominco staff geologists, particularly Dr. J. M. Allen and R. Nichols, associated with the Valley Copper project. Thanks are also extended to D. Miller, of Bethlehem Copper Corporation Ltd., and Darkhawk Mines Ltd. for their co-operation. X-ray analyses were done by N. Colvin, of the Department of Mines and Petroleum Resources.

Introduction

The Valley Copper deposit underlies the Highland Valley west of Quiltanton Lake. The surface projection of the deposit extends from the valley floor to elevation 4,350 feet on the southwest slope and is slightly elongated to the northwest (Fig. 47). The Highland Valley is floored by Pleistocene glaciofluvial sands and gravels which contain till layers. Overburden is less than 100 feet thick over much of the deposit, but thickens to more than 500 feet near its northeast edge. Under Quiltanton Lake, Pleistocene deposits reach a thickness of more than 850 feet.

The mineral deposit is entirely in quartz monzonite of the Bethsaida phase of the Guichon Creek Batholith and is west of the Lornex fault (Fig. 48). The rocks of the deposit were subjected to argillic alteration, followed by extensive quartz veining, quartz-sericite veining, and silicification. Bornite and chalcopyrite were introduced with the quartz and quartz-sericite veins, and typically fill angular openings in them. Molybdenite which occurs with the copper sulphides is widespread but sparse. Pyrite is uncommon, but up to 2 per cent hematite occurs in the deposit (Allen and Richardson, 1970). Pre-ore porphyry and aplite dykes and post-ore porphyry and lamprophyre dykes are present but not common. Apparently dykes have little influence on ore deposition.

History

According to Allen and Richardson (1970), the area of the deposit was considered interesting in 1966 because regional geologic mapping begun in 1964 suggested that

(1) ore deposits in Highland Valley are structurally controlled;
(2) the fault which apparently cuts off the west side of the Lornex deposit passes through Quiltanton Lake;
(3) offset on the Lornex fault was right lateral and of the order of 2 miles;
(4) Highland Valley might be underlain by a fault which could produce conditions favourable to ore deposition at or near its junction with the Lornex fault.

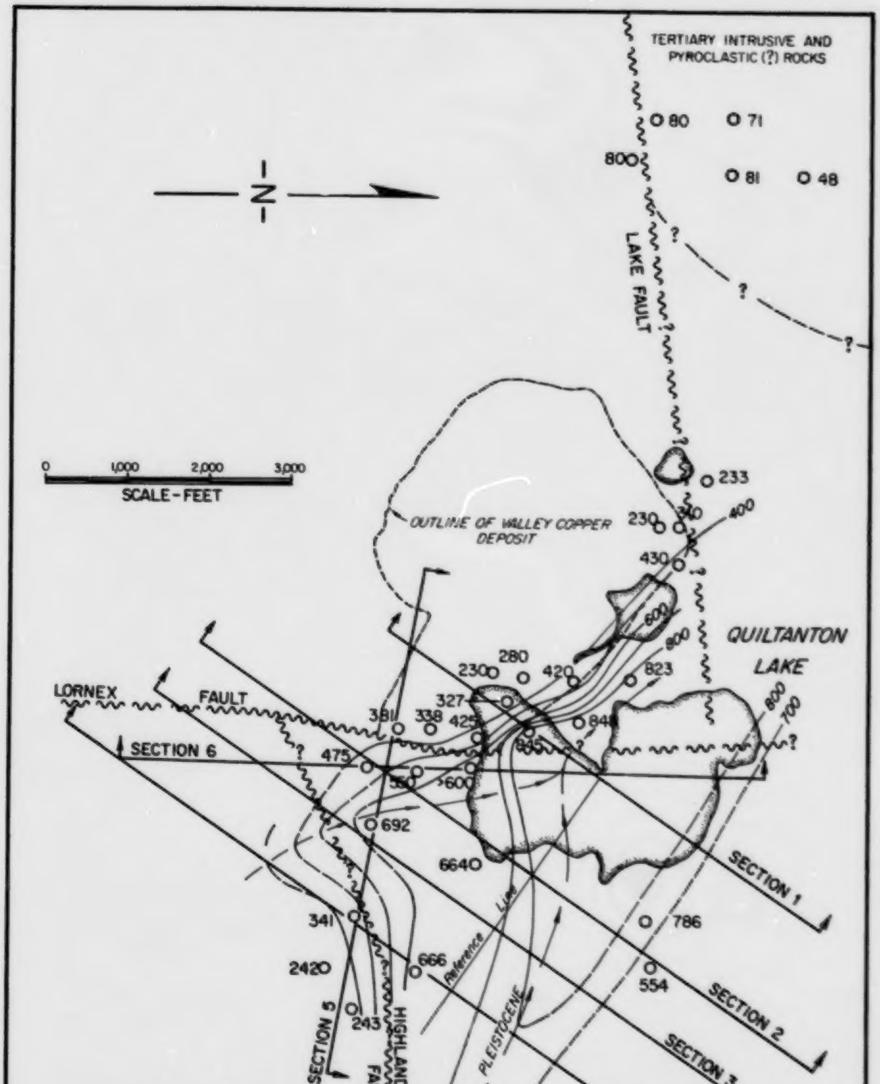

TERTIARY INTRUSIVE AND PYROCLASTIC (?) ROCKS
80
71
800
81
48
N
LAKE FAULT
0
1,000
2,000
3,000
SCALE-FEET
233
OUTLINE OF VALLEY COPPER DEPOSIT
230
240
400
430
600
800
QUILTANTON LAKE
280
230
420
823
LORNEX
FAULT
327
381
338
425
840
845
SECTION 6
475
550
>600
692
664
SECTION 1
341
786
242
666
Reference Line
554
SECTION 2
SECTION 5
243
HIGHLAND VALLEY FAULT
DRAINAGE DURING PLEISTOCENE
SECTION 3
SECTION 4
733
1330
700
800
TERTIARY VOLCANIC NECK
700
CONTOURS REPRESENT DEPTH TO BEDROCK BELOW SURFACE.
VERTICAL SECTION LINES.
DRAINAGE BASED ON EARLY PLEISTOCENE BEDROCK GEOMETRY.
450
DIAMOND DRILL HOLE WITH DEPTH TO BEDROCK INDICATED.

Figure 47. Regional fault patterns, Pleistocene topography, and distribution of Tertiary volcanic and sedimentary rocks adjacent to Valley Copper deposit.

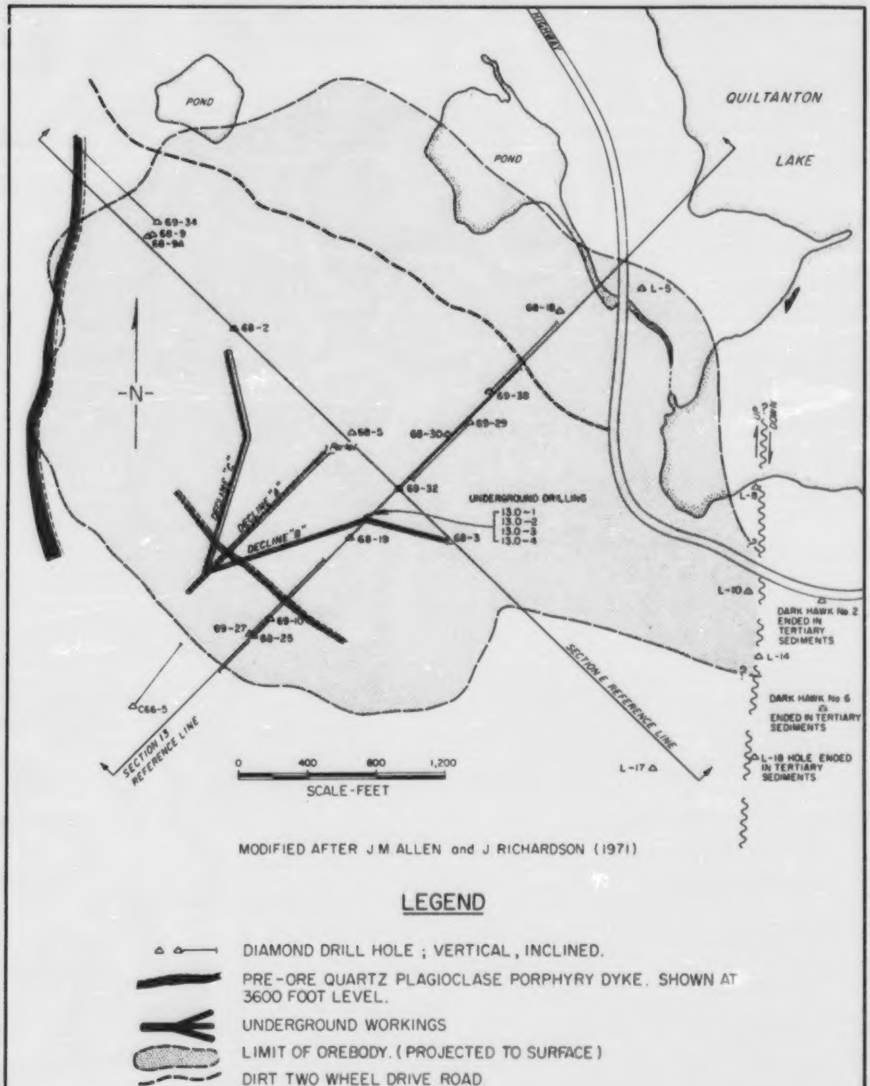

HIGHWAY
POND
POND
QUILTANTON
LAKE
69-34
68-9
68-9A
68-2
-N-
DECLINE "C"
DECLINE "A"
DECLINE "B"
68-5
68-30
69-29
69-38
68-18
L-5
68-32
UNDERGROUND DRILLING
13.0-1
13.0-2
13.0-3
13.0-4
68-19
68-3
69-27
69-10
68-25
C66-5
SECTION 13 REFERENCE LINE
SECTION E REFERENCE LINE
UP ? DOWN
L-8
L-10
DARK HAWK No 2 ENDED IN TERTIARY SEDIMENTS
L-14
DARK HAWK No 6 ENDED IN TERTIARY SEDIMENTS
L-18 HOLE ENDED IN TERTIARY SEDIMENTS
L-17
0
400
800
1,200
SCALE-FEET
MODIFIED AFTER J M ALLEN and J RICHARDSON (1971)
LEGEND
DIAMOND DRILL HOLE ; VERTICAL , INCLINED.
PRE-ORE QUARTZ PLAGIOCLASE PORPHYRY DYKE. SHOWN AT 3600 FOOT LEVEL.
UNDERGROUND WORKINGS
LIMIT OF OREBODY. (PROJECTED TO SURFACE)
DIRT TWO WHEEL DRIVE ROAD
MAP OF VALLEY COPPER PROSPECT
SHOWING THE EXTENT OF THE OREBODY , LOCATION OF SECTIONS, UNDERGROUND WORKINGS , DIAMOND DRILL HOLES LOGGED , AND GEOLOGY.
THE OREBODY OCCURS ENTIRELY IN BETHSAIDA QUARTZ MONZONITE

Figure 48. Map of Valley Copper prospect.

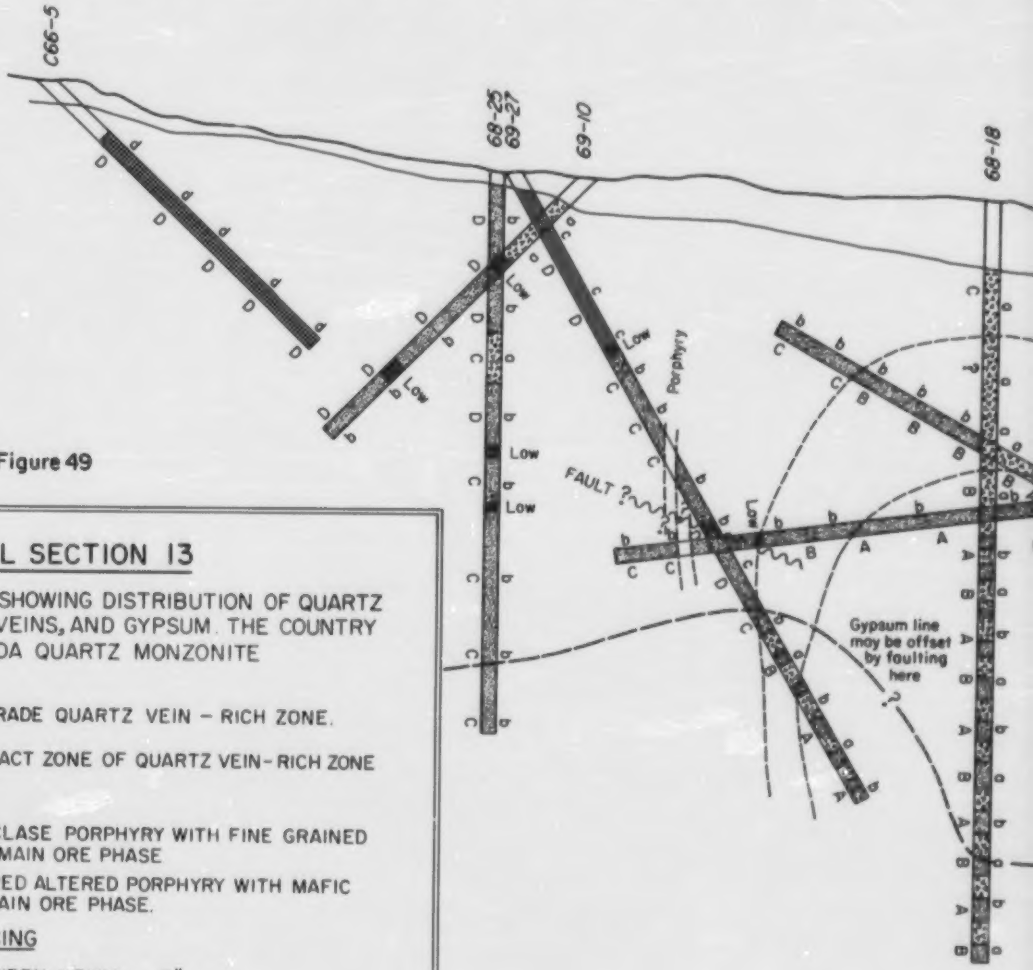

C66-5
68-25
69-27
69-10
68-18
Low
Porphyry
FAULT ?
Gypsum line may be offset by faulting here
?
A
B
C
D
a
b
c
d

Figure 49

VERTICAL SECTION 13

VALLEY COPPER PROPERTY SHOWING DISTRIBUTION OF QUARTZ VEINS, QUARTZ-SERICITE VEINS, AND GYPSUM. THE COUNTRY ROCK IS BETHSAIDA QUARTZ MONZONITE

☐ RELATIVELY LOW GRADE QUARTZ VEIN - RICH ZONE.

☐ TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE

DYKES

PORPHYRY : QUARTZ-PLAGIOCLASE PORPHYRY WITH FINE GRAINED GREEN MATRIX. PRE-MAIN ORE PHASE

LAMPROPHYRE : DARK COLOURED ALTERED PORPHYRY WITH MAFIC PHENOCRYSTS. POST MAIN ORE PHASE.

QUARTZ-SERICITE VEIN SPACING

▨ a — DISTANCE BETWEEN VEINS — 6"
▨ b — — 6" to 1'
▨ c — — 1' to 3'
▨ d — — > 3'

QUARTZ VEIN SPACING

A — DISTANCE BETWEEN VEINS — < 1'
B — — 1' to 2'
C — — 2' to 5'
D — — > 5'

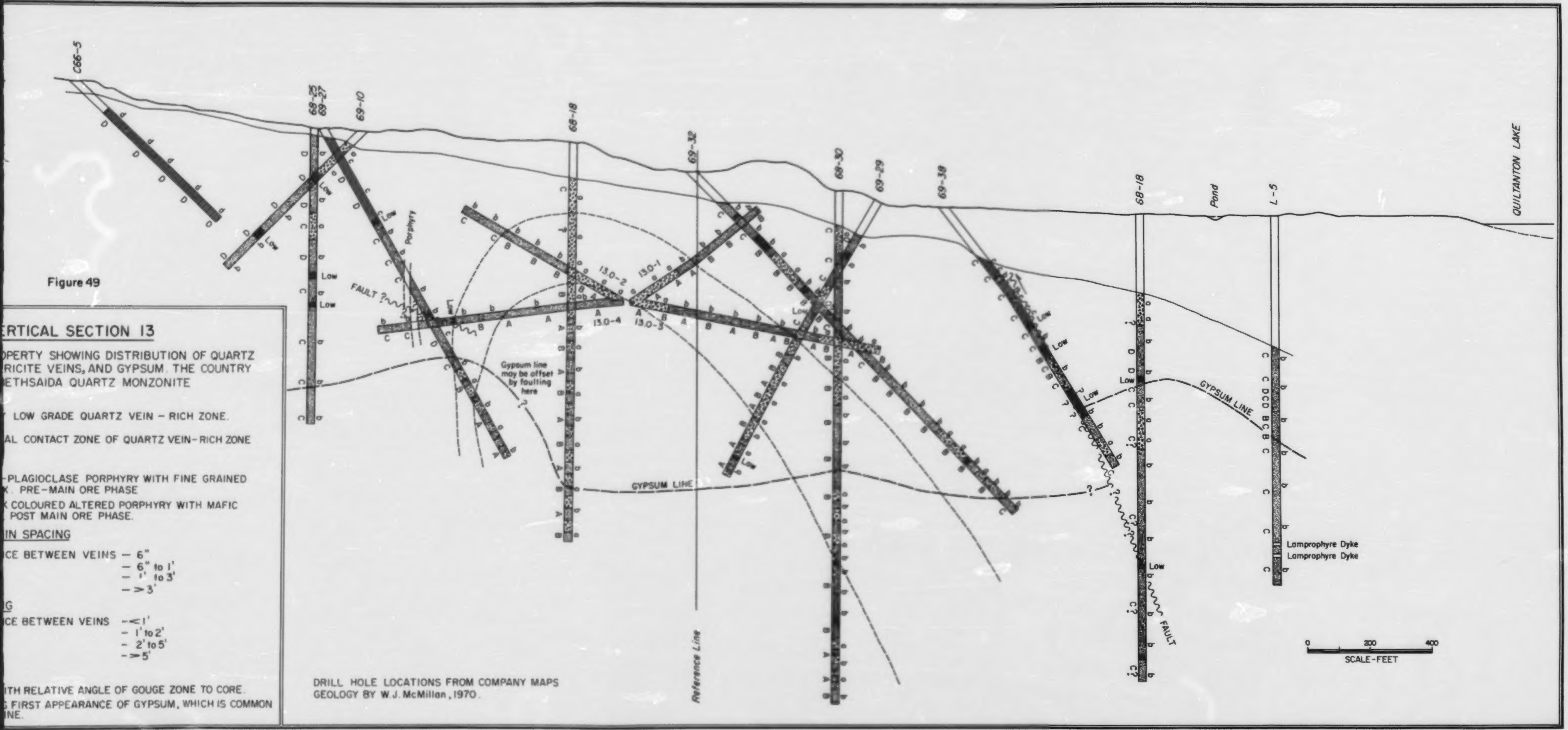
SYMBOLS

Low — FAULT ZONE WITH RELATIVE ANGLE OF GOUGE ZONE TO CORE.

— — — LINE SHOWING FIRST APPEARANCE OF GYPSUM, WHICH IS COMMON BELOW THE LINE.

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J. McMillan, 1970.

Figure 49



ERTICAL SECTION 13

OPERTY SHOWING DISTRIBUTION OF QUARTZ
RICITE VEINS, AND GYPSUM. THE COUNTRY
ETHSAIDA QUARTZ MONZONITE

Y LOW GRADE QUARTZ VEIN – RICH ZONE.

AL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE

-PLAGIOCLASE PORPHYRY WITH FINE GRAINED
X. PRE-MAIN ORE PHASE

K COLOURED ALTERED PORPHYRY WITH MAFIC
POST MAIN ORE PHASE.

IN SPACING

CE BETWEEN VEINS – 6"
– 6" to 1'
– 1' to 3'
– > 3'

G

CE BETWEEN VEINS – < 1'
– 1' to 2'
– 2' to 5'
– > 5'

ITH RELATIVE ANGLE OF GOUGE ZONE TO CORE.

FIRST APPEARANCE OF GYPSUM, WHICH IS COMMON
INE.

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J. McMillan, 1970.

C66-5
68-25
69-27
69-10
68-18
69-32
68-30
69-29
69-39
68-18
Pond
L-5
QUILTANTON LAKE
Low
Porphyry
FAULT ?
13.0-2
13.0-1
13.0-4
13.0-3
Gypsum line may be offset by faulting here
GYPSUM LINE
GYPSUM LINE
Reference Line
FAULT
Lamprophyre Dyke
Lamprophyre Dyke
0
200
400
SCALE-FEET

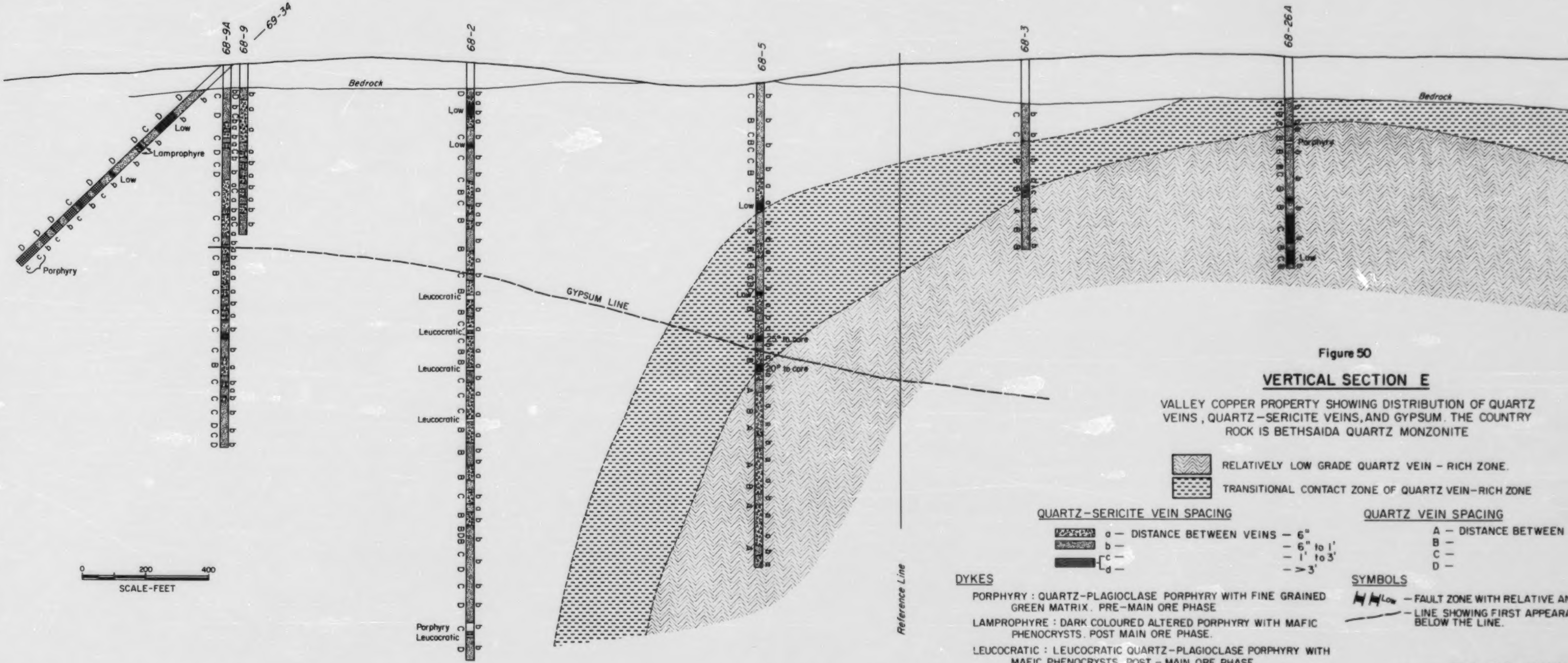

68-9A
68-9
69-34
68-2
68-5
68-3
68-26A
Bedrock
Bedrock
Low
Lamprophyre
Porphyry
Leucocratic
Porphyry
Leucocratic
GYPSUM LINE
25° to core
20° to core
Reference Line
0
200
400
SCALE-FEET

Figure 50

VERTICAL SECTION E

VALLEY COPPER PROPERTY SHOWING DISTRIBUTION OF QUARTZ VEINS, QUARTZ-SERICITE VEINS, AND GYPSUM. THE COUNTRY ROCK IS BETHSAIDA QUARTZ MONZONITE

▨ RELATIVELY LOW GRADE QUARTZ VEIN - RICH ZONE.

▨ TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE

QUARTZ-SERICITE VEIN SPACING

a — DISTANCE BETWEEN VEINS — 6"
b — — 6" to 1'
c — — 1' to 3'
d — — > 3'

QUARTZ VEIN SPACING

A — DISTANCE BETWEEN
B —
C —
D —

DYKES

PORPHYRY : QUARTZ-PLAGIOCLASE PORPHYRY WITH FINE GRAINED GREEN MATRIX. PRE-MAIN ORE PHASE

LAMPROPHYRE : DARK COLOURED ALTERED PORPHYRY WITH MAFIC PHENOCRYSTS. POST MAIN ORE PHASE.

LEUCOCRATIC : LEUCOCRATIC QUARTZ-PLAGIOCLASE PORPHYRY WITH MAFIC PHENOCRYSTS. POST - MAIN ORE PHASE.

SYMBOLS

Low — FAULT ZONE WITH RELATIVE AN
— LINE SHOWING FIRST APPEARA BELOW THE LINE.

DRILL HOLE LOCATION
GEOLOGY BY W.J. McM

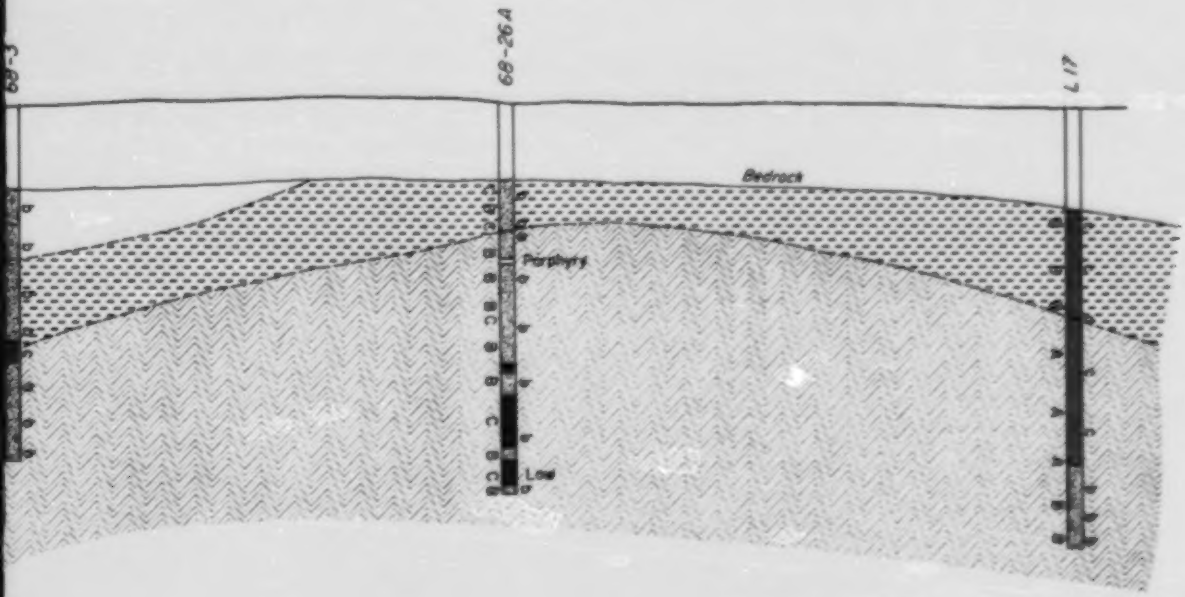


Figure 50

VERTICAL SECTION E

VALLEY COPPER PROPERTY SHOWING DISTRIBUTION OF QUARTZ VEINS, QUARTZ–SERICITE VEINS, AND GYPSUM. THE COUNTRY ROCK IS BETHSAIDA QUARTZ MONZONITE

▨ RELATIVELY LOW GRADE QUARTZ VEIN – RICH ZONE.

▨ TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN–RICH ZONE

QUARTZ–SERICITE VEIN SPACING

▨ a — DISTANCE BETWEEN VEINS — 6"
▨ b — — 6" to 1'
■ c — — 1' to 3'
■ d — — > 3'

QUARTZ VEIN SPACING

A — DISTANCE BETWEEN VEINS — < 1'
B — — 1' to 2'
C — — 2' to 5'
D — — > 5'

SYMBOLS

— FAULT ZONE WITH RELATIVE ANGLE OF GOUGE ZONE TO CORE.

— LINE SHOWING FIRST APPEARANCE OF GYPSUM, WHICH IS COMMON BELOW THE LINE.

Y : QUARTZ–PLAGIOCLASE PORPHYRY WITH FINE GRAINED
EEN MATRIX. PRE–MAIN ORE PHASE

HYRE : DARK COLOURED ALTERED PORPHYRY WITH MAFIC
ENOCRYSTS. POST MAIN ORE PHASE.

TIC : LEUCOCRATIC QUARTZ–PLAGIOCLASE PORPHYRY WITH
FIC PHENOCRYSTS POST – MAIN ORE PHASE.

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W. J. McMillan, 1970.

Percussion drilling on the Bethsaida claims began in 1967 and continued in 1968. The Valley Copper deposit was discovered in 1968 as a result of percussion drilling of a target area outlined by an induced polarization survey (*Minister of Mines, B.C.*, Ann. Rept., 1968, p. 181). Extensive diamond drilling was also begun in 1968. At that time Carr (op. cit., p. 181) suggested that the Valley and Lornex deposits are segments of one orebody which was split by post-mineral faulting. In 1969 an underground exploration and bulk-sampling programme was begun which was completed in mid-1970. Surface and underground diamond drilling was also continued in 1970. At completion of the programme the company announced that the deposit contains 600,000 tons per vertical foot, grading 0.48 per cent copper to a depth of 1,450 feet; that is, ore reserves are more than 850 million tons. Subsequently, the property has been idle pending the outcome of feasibility studies.

Host Rock

The Valley Copper deposit is within essentially one rock type, Bethsaida quartz monzonite. This has been extensively shattered, altered, veined, and mineralized. In much of the underground workings (Fig. 48) and in much of the drilling (Figs. 49 and 50) veins are so abundant that the rock consists of angular fragments separated by veins. Fragments have not been rotated but only separated, hence the area of the deposit is best termed a shatter zone (Allen and Richardson, 1970).

Beyond the deposit, Bethsaida quartz monzonite consists of coarsely crystalline euhedral complexly zoned plagioclase, euhedral biotite books, and subhedral quartz with interstitial anhedral quartz and perthitic microcline (Northcote, 1969, p. 37). In the deposit, feldspars are clouded by alteration, plagioclase zoning is commonly destroyed, biotite is altered, and microcline may be destroyed. Quartz crystals are generally enlarged, most markedly so near veins (Plate XVIA).

Local textural and mineralogical variations occur in the Bethsaida quartz monzonite at Valley Copper, but evidently do not influence ore distribution. Mafic areas are seen in drill core which contain up to 40 per cent combined magnetite and biotite as well as abundant apatite. Similar mafic areas which were mapped outside and west of the orebody form ill-defined bodies which grade into normal Bethsaida quartz monzonite. Local areas are also seen in drill core in which the Bethsaida quartz monzonite is porphyritic, with aplitic or subaplitic matrix. Similar porphyritic areas which were studied elsewhere in the Bethsaida quartz monzonite are patchily distributed and grade into normal Bethsaida. They do not form mappable units. It is surmised that in the mafic areas heavy minerals were concentrated by current action as the crystal-liquid mush which now constitutes the Bethsaida phase was emplaced. Porphyritic zones probably resulted from uneven distribution of volatiles throughout the crystal-liquid mush. Areas relatively poor in volatiles would solidify at higher temperatures with less crystal growth and resultant porphyritic textures.

Dykes

Both pre- and post-ore dykes occur in the Valley Copper deposit, but dykes are volumetrically insignificant. Within the orebody, pre-ore dykes are veined and mineralized like the country rock. At the northwest edge of the deposit, however, they seem to have been only semipermeable to mineralizing solutions and now virtually mark the limit of the ore (Fig. 48).

There are two varieties of pre-ore dykes. Both are quartz plagioclase porphyries, both have aplitic matrices. One set, leucocratic quartz plagioclase porphyry, that has a pinkish tan or rarely salmon pink matrix, forms narrow dykes that commonly occur in swarms. The second and predominant set consists of biotite

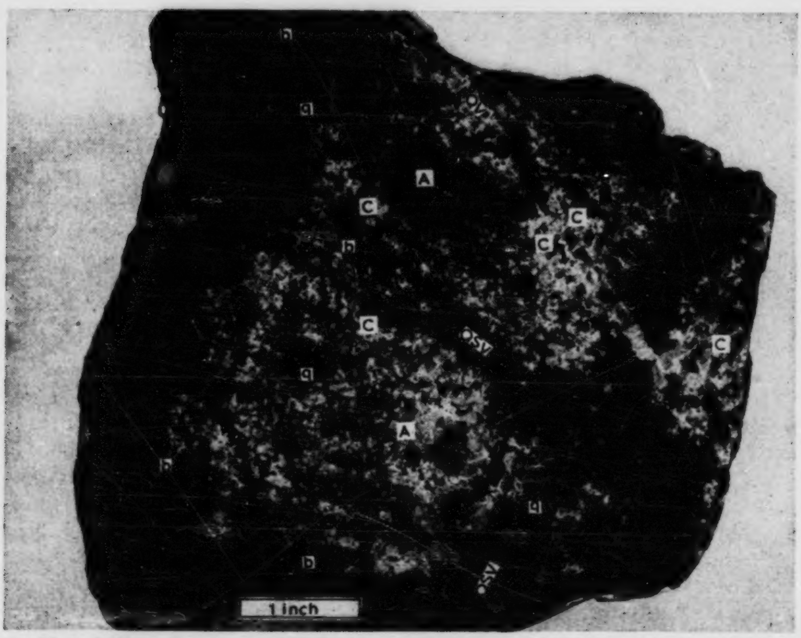


Plate XVIA.—Specimen of Bethsaida quartz monzonite from the Valley Copper deposit. Pale green argillic alteration (A) is overprinted by cream-coloured alteration (C) adjacent to green hematite-chalcopyrite-bornite-quartz-sericite veins (QSV), and a quartz vein (QV). The barren quartz vein cuts mineralized quartz-sericite veins. Biotite in the specimen (b) has altered to a mixture of sericite and siderite. Quartz crystals (q) are coarse grained and subhedral to uneven. Near quartz-sericite veins quartz crystals are enlarged.

quartz plagioclase porphyry that has a green matrix and forms narrow to wide dykes.

Two varieties of post-ore dykes also occur. One set, leucocratic quartz plagioclase porphyry, forms narrow dykes and is similar to leucocratic pre-ore dykes. However, it is not veined or mineralized. The second set, lamprophyre, forms narrow dykes which are dark green and speckled with mafic phenocrysts. Based on staining and thin-section analysis, potash feldspar is the dominant feldspar in the lamprophyres. Thus they are biotite augite or hornblende augite vogesites. Lamprophyres are extensively altered to sericite, chlorite, and carbonate, and the latter also veins the rock.

Trends of Dykes

None of the dykes crop out, but drilling and underground workings have shown that they strike north or southeast. Various level plans which have been drawn by Cominco geologists indicate that dips are steep. An individual dyke commonly varies in dip either side of vertical. Some dykes apparently bifurcate. No trends were determined for lamprophyre dykes, but pre-ore and post-ore porphyries have parallel trends. Dykes probably occupy joints or subsidiary faults formed during movement on the nearby Lornex fault.

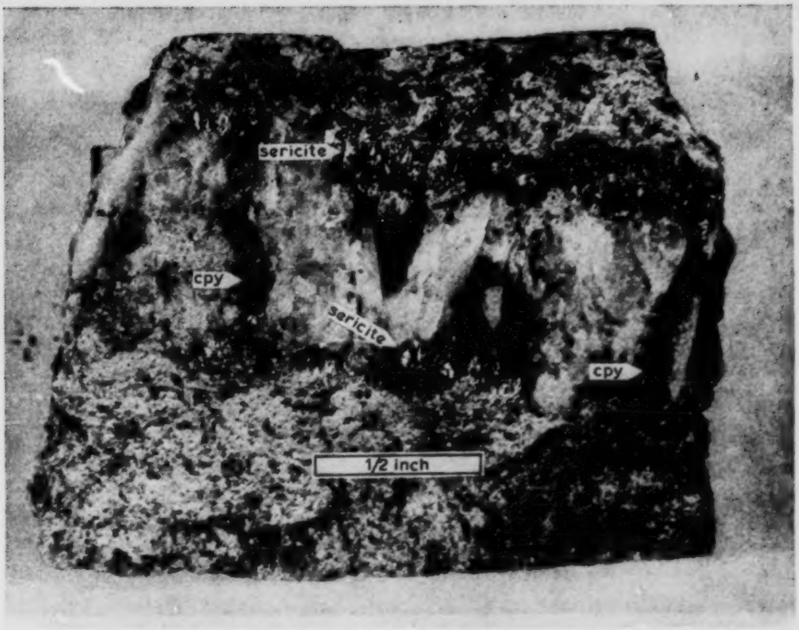


Plate XVIb.—Vuggy quartz vein with vugs lined by quartz crystals with terminations. The vein has a border of coarse-grained sericite. Chalcopyrite (cpy) fills angular spaces in the vein.

Structural Setting

The mineral deposit is west of the Lornex fault near its junction with the northeast-trending Lake and Highland Valley faults (Fig. 47). The existence of the Lornex fault is well documented immediately south of Quiltanton Lake and farther south near the Lornex deposit, where it offsets the Bethsaida-Bethlehem contact. The Highland Valley fault, which occurs along Highland Valley east of the Lornex fault, is inferred from drilling on Indian Reserve 13. The holes intersected a wedge of Tertiary sedimentary rocks bounded by steep slopes on its west and south sides. The Lake fault along Highland Valley west of the Lornex fault is inferred from drilling on ground west of Quiltanton Lake owned by Arlington Silver Mines Ltd. The drill holes cut Tertiary volcanic rocks in a basin which is bounded on its south side by a very steep slope.

Structural Data From Valley Copper Declines

Structural data from the underground workings are highlighted on the accompanying table, which is a synopsis of Figure 51. Characteristically, dominant faults comprise one south-southeast-striking set which dips steeply northeast and one subhorizontal set. Joints have a corresponding south-southeast-striking set as well as an east-southeast-striking set which dips steeply southwest in declines A and B and steeply northeast in decline C. Veins have south-southeast- and east-southeast-striking sets which are parallel to the predominant fault set and both joint sets.

Structural data from declines A, B, and C were plotted on an equal area stereographic projection and contoured. Concentrations of poles to joints and veins almost coincide (Fig. 51). Similarly, in decline A and to a lesser extent in

Valley Copper—Most Prominent Structural Trends in Declines

	Faults	Joints	Veins
Decline A	173/64NE 000/16E ——— 018/54SE nonsignificant? 004/90	169/68NE ——— 108/68SW ——— ———	161/64NE 034/15SE 104/71SW ——— ———
Decline B	No data	163/58NE 111/75SW 037/42SE 038/54NW ——— ———	156/65NE 110/80SW ——— ——— 094/23SW } nonsignificant? 100/42NE }
Decline C	160/50NE 108/84SW ——— ——— 108/25SW 000/00	160/60NE 118/84SW 125/75NE 073/18SE ——— ———	152/56NE 111/79SW 126/74NE ——— 101/42SW 047/10SE

	Faults	Joints	Veins	General Comment
Over-all Trends	One steep south-southeast set (NE. dip) One subhorizontal set	One steep south-southeast set (NE. dip) One steep east-southeast set (SW. and NE. dips)	One steep south-southeast set (NE. dip) One steep east-southeast set (SW. and NE. dips)	Veins occupy, that is, are younger than joints and faults. Post-mineralization movement is common.

decline C, where only 51 faults are plotted, concentrations of poles to veins and faults nearly coincide. The explanation for these data is that veins occupy faults and joints.

As was mentioned previously, faults in the main set at Valley Copper strike south-southeast and dip 50 to 60 degrees toward the northeast. Presumably these faults are offshoots of and subparallel to the nearby Lornex fault. Thus, the Lornex fault may also dip steeply northeast near Quiltanton Lake and the apparent change in strike south of the lake may be a topographic effect. Near Lornex, drilling suggests the Lornex fault has a steep westerly dip. No steeply dipping faults subparallel to the Lake fault are recorded from decline A and only a few occur in decline C. Hence, the underground workings provide little evidence of a fault parallel to Highland Valley west of the Lornex fault.

A model is advanced to explain right lateral movement on the Lornex fault. In this model the maximum principal stress (σ_1) is subhorizontal and oriented northeast-southwest, the intermediate principal stress (σ_2) is steeply inclined, and the minimum principal (σ_3) is subhorizontal and oriented southeast-northwest. If right lateral movement on Lornex fault is responsible for many of the joints at Valley Copper, theoretically one would expect to find steeply dipping shear joints striking subparallel to and about 35 degrees northeastward of the Lornex fault and steeply dipping tension joints striking about 20 degrees northeastward of the fault in the σ_1-σ_2 plane. As a result of stress relaxation after movement on the fault, one would expect tension joints to form in the σ_1-σ_3 plane with strike azimuth about 110 degrees. Two sets of joints occur as predicted—these are a set subparallel to the Lornex fault (shear joints?) and a set striking at azimuth 110 degrees (later tension joints?). The predicted secondary shear and tension joint sets were not recognized.

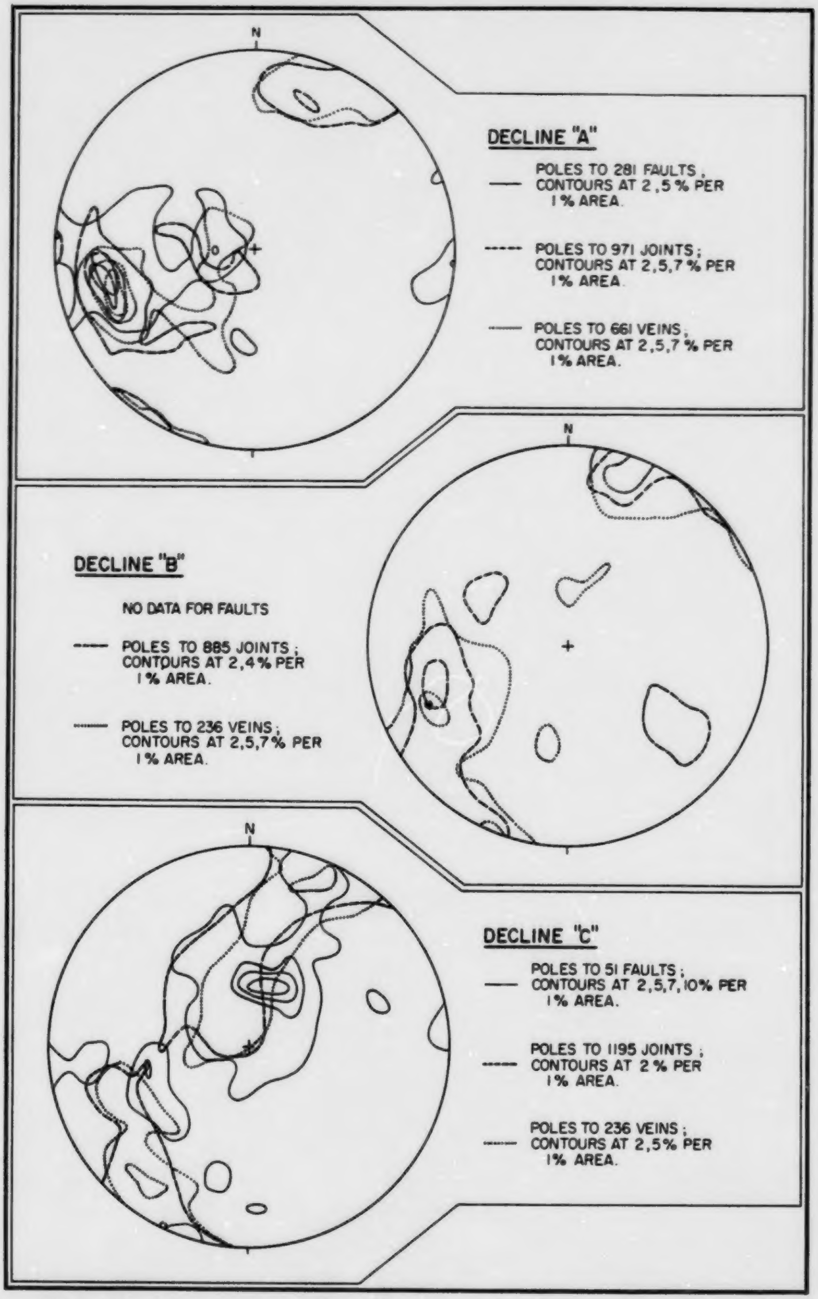

N
DECLINE "A"
POLES TO 281 FAULTS, CONTOURS AT 2,5% PER 1% AREA.
POLES TO 971 JOINTS; CONTOURS AT 2,5,7% PER 1% AREA.
POLES TO 661 VEINS, CONTOURS AT 2,5,7% PER 1% AREA.
N
DECLINE "B"
NO DATA FOR FAULTS
POLES TO 885 JOINTS; CONTOURS AT 2,4% PER 1% AREA.
POLES TO 236 VEINS; CONTOURS AT 2,5,7% PER 1% AREA.
N
DECLINE "C"
POLES TO 51 FAULTS; CONTOURS AT 2,5,7,10% PER 1% AREA.
POLES TO 1195 JOINTS; CONTOURS AT 2% PER 1% AREA.
POLES TO 236 VEINS; CONTOURS AT 2,5% PER 1% AREA.

Figure 51. Equal area projections of structural data from underground working at Valley Copper property. Positions of maxima were measured and are presented in the table (page 360). Raw data supplied by the company.

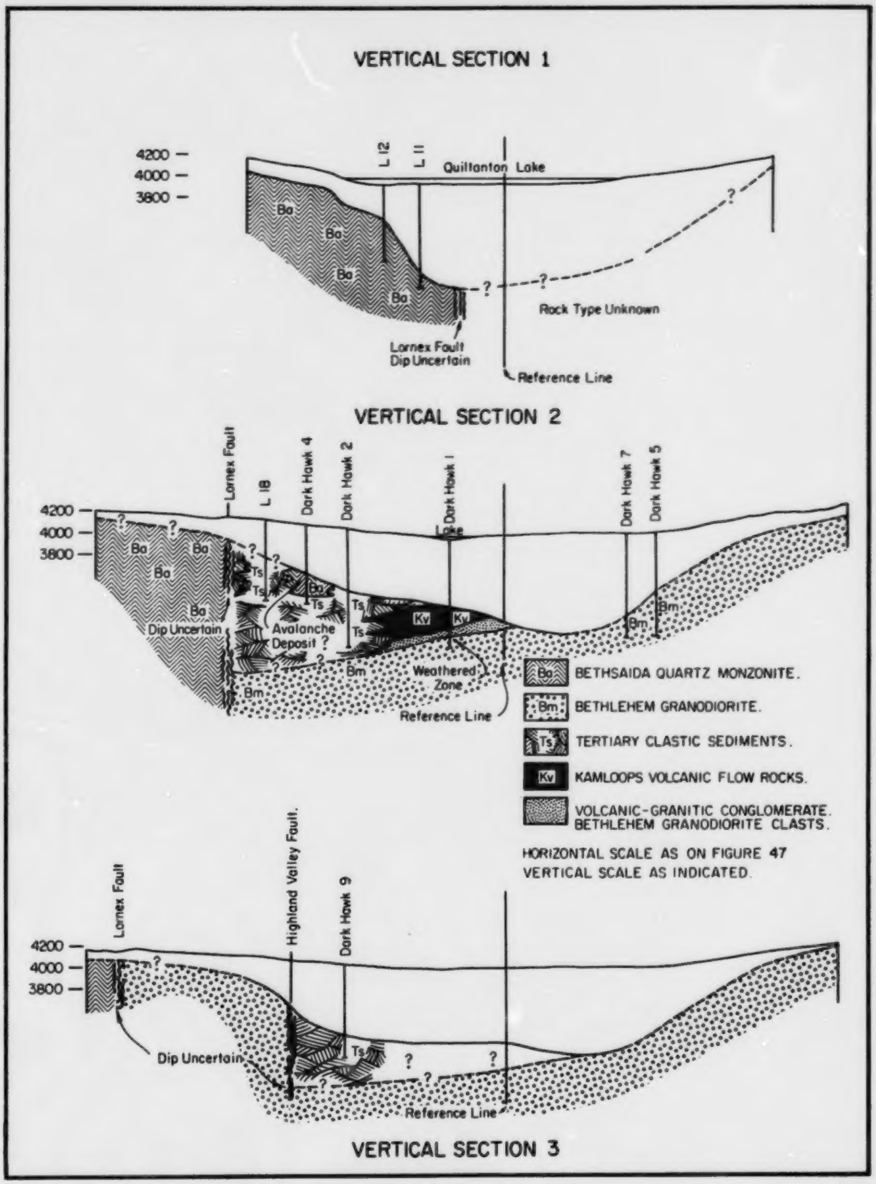

VERTICAL SECTION 1
4200
4000
3800
L 12
L 11
Quiltanton Lake
Ba
Ba
Ba
Ba
?
?
?
Rock Type Unknown
Lornex Fault
Dip Uncertain
Reference Line
VERTICAL SECTION 2
Lornex Fault
L 18
Dark Hawk 4
Dark Hawk 2
Dark Hawk 1
Dark Hawk 7
Dark Hawk 5
4200
4000
3800
Lake
Ba
Ba
Ba
Ba
Ts
Ts
Ts
Ts
Ts
Kv
Kv
Bm
Bm
Bm
Bm
Dip Uncertain
Avalanche Deposit ?
Weathered Zone
Reference Line
Ba BETHSAIDA QUARTZ MONZONITE.
Bm BETHLEHEM GRANODIORITE.
Ts TERTIARY CLASTIC SEDIMENTS.
Kv KAMLOOPS VOLCANIC FLOW ROCKS.
VOLCANIC-GRANITIC CONGLOMERATE. BETHLEHEM GRANODIORITE CLASTS.
HORIZONTAL SCALE AS ON FIGURE 47
VERTICAL SCALE AS INDICATED.
Lornex Fault
Highland Valley Fault.
Dark Hawk 9
4200
4000
3800
Ts
?
?
?
?
Dip Uncertain
Reference Line
VERTICAL SECTION 3

Figure 52. Vertical sections 1, 2, 3, Valley Copper property.

Subhorizontal faults and joints are apparently anomalous in the model. However, two possible explanations are:

(1) After the main period of faulting was complete, the intermediate and minimum principal stresses interchanged. That is, the subhorizontal structures are small-scale late-stage thrust faults and shear joints.

(2) Spreading of fragments in the Valley Copper shatter zone suggests high fluid pressures. If a convection cell was in operation during ore emplacement, the underground workings are in what was the upwelling zone because they are close to the quartz-rich centre of the deposit. Thus, the gently dipping structures may be tension faults and joints formed as convective flow waned and surged during vein and ore formation.

If the second possibility is correct, the high fluid pressure may have initiated vertical movement on the Lornex fault during mineralization.

One aspect of this proposed model is that the Valley copper deposit would post-date at least some right lateral movement on the Lornex fault.

Tertiary Sedimentation, Vulcanism, and Faulting

In the Tertiary basin bounded by the Lornex and Highland Valley faults, slightly indurated sedimentary rocks predominate. The rocks form a wedge which thins rapidly toward the northeast (sections 2 and 3, Fig. 52) and is probably more than 1,000 feet thick near the junction of the faults (sections 2, 5, and 6, Figs. 52 and 53). The sedimentary rocks are immature siltstones and pebble conglomerates with local black, massive to laminated argillite layers and thin coaly layers. Bedding laminæ are typically at 40 to 85 degrees to the axes of vertical diamond-drill holes, that is, dips commonly range from 5 to 50 degrees. However, dips between 25 and 40 degrees predominate. The immature nature of the rocks and varying dips suggest they represent deltaic and lake-bottom deposits. Many of the pebbles in the conglomerates were derived from a granitic terrain, thus transport was probably from the west and south.

To the northeast, the sedimentary rocks thin rapidly and are apparently intertongued with a conglomerate containing fragments of volcanic rock and Bethlehem granodiorite. The conglomerate grades downward into unweathered Bethlehem granodiorite and is overlain by amygdaloidal dacitic andesite of the Kamloops Group. The flows are also inferred to be intertongued with the sedimentary rocks to the southwest. The volcanic source area is to the northeast (section 4, Fig. 53). In summary, the Tertiary basin was filled by clastic material eroded from granitic highlands to the south and west and by clastic and volcanic material from source areas to the northeast.

The Tertiary depositional area bounded by the Lake fault was filled by volcanic material. The volcanic deposits consist both of agglomerate and foliated porphyritic igneous rocks which may be dykes. Outcrops and drilling indicate that the deposits are thick near the fault and thin to the north and west. Drilling north and south of the Lake fault indicates a 75-degree minimum dip for the fault scarp which is the south boundary of the basin. Drill holes indicate that the biotite-plagioclase porphyry dykes cut both the underlying granodiorite and the agglomerates. Most fragments in the agglomerates have the same composition as the dykes. The depositional basin probably contained one or more Tertiary volcanoes.

The Tertiary basins are bounded by the north-striking Lornex and easterly striking Lake and Highland Valley faults and result from block faulting in Highland Valley. As was previously discussed, dextral movement occurred along the Lornex fault before formation of the Valley Copper deposit. The Lake and Highland Val-

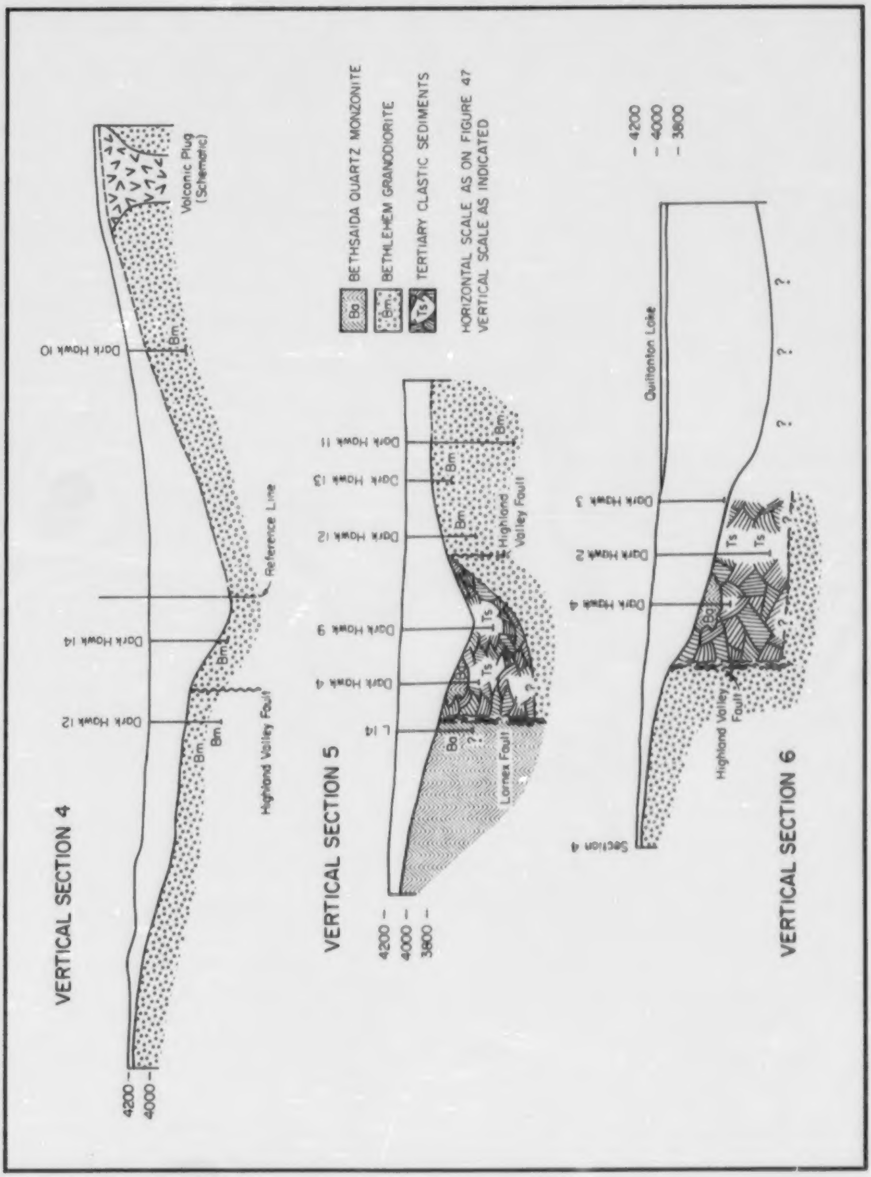

VERTICAL SECTION 4
4200
4000
Dark Hawk 12
Bm
Bm
Bm
Highland Valley Fault
Dark Hawk 14
Bm
Reference Line
Dark Hawk 10
Bm
Volcanic Plug (Schematic)
Ba BETHSAIDA QUARTZ MONZONITE
Bm BETHLEHEM GRANODIORITE
Ts TERTIARY CLASTIC SEDIMENTS
HORIZONTAL SCALE AS ON FIGURE 47
VERTICAL SCALE AS INDICATED
VERTICAL SECTION 5
4200
4000
3800
L 14
Ba
?
Lornex Fault
Dark Hawk 4
Ba
Ts
?
Dark Hawk 9
Ts
Dark Hawk 12
Bm
Highland Valley Fault
Dark Hawk 13
Bm
Dark Hawk 11
Bm
VERTICAL SECTION 6
Section 4
Highland Valley Fault
Dark Hawk 4
Ba
?
Dark Hawk 2
Ts
Ts
Dark Hawk 3
?
Quiltanton Lake
? ? ? ?
4200
4000
3800

Figure 53. Vertical sections 4, 5, 6, Valley Copper property.

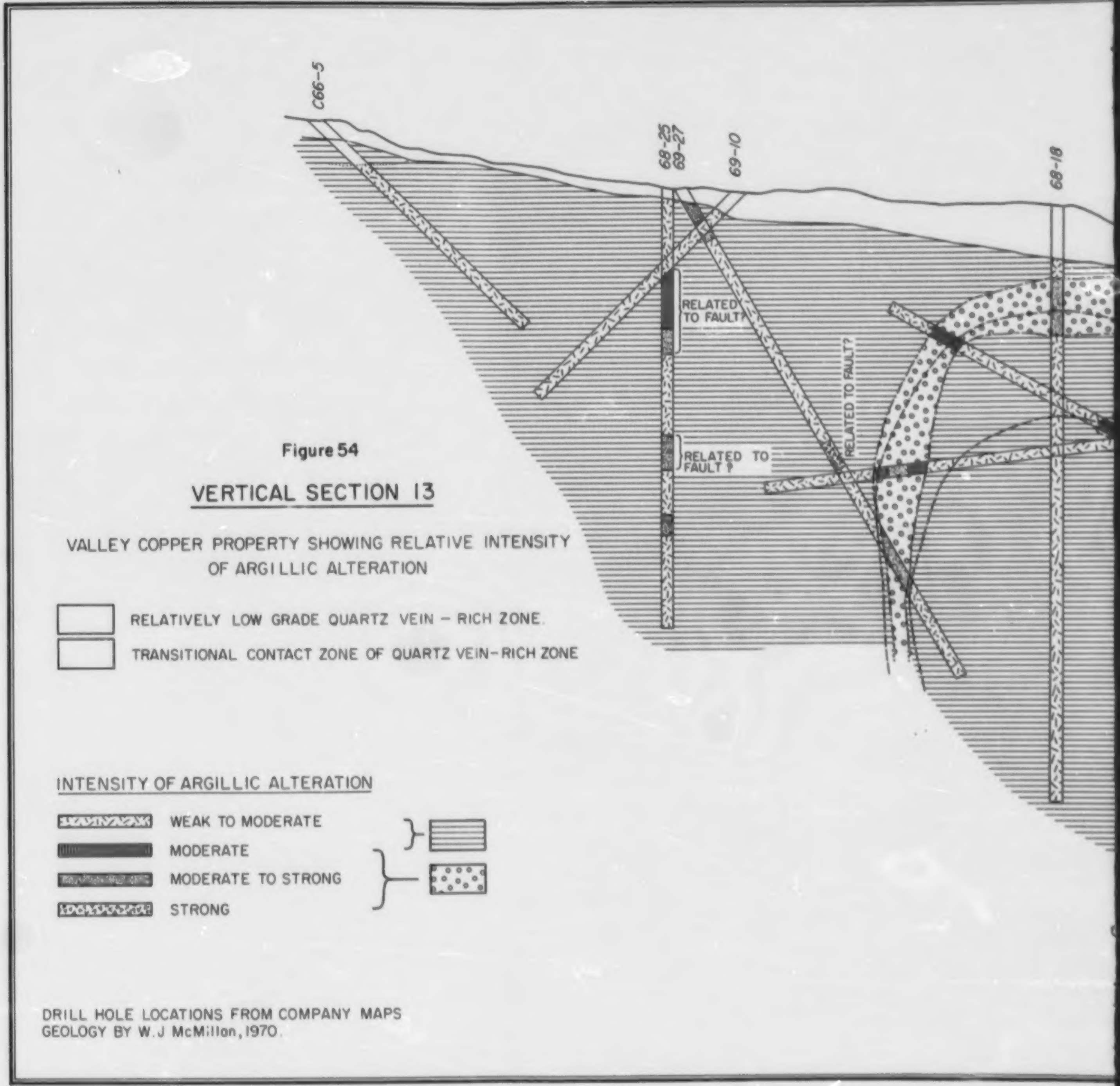


Figure 54

VERTICAL SECTION 13

VALLEY COPPER PROPERTY SHOWING RELATIVE INTENSITY OF ARGILLIC ALTERATION

C66-5
68-25
69-27
69-10
68-18
RELATED TO FAULT?
RELATED TO FAULT?
RELATED TO FAULT?
RELATIVELY LOW GRADE QUARTZ VEIN – RICH ZONE.
TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE
INTENSITY OF ARGILLIC ALTERATION
WEAK TO MODERATE
MODERATE
MODERATE TO STRONG
STRONG

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J McMillan, 1970.

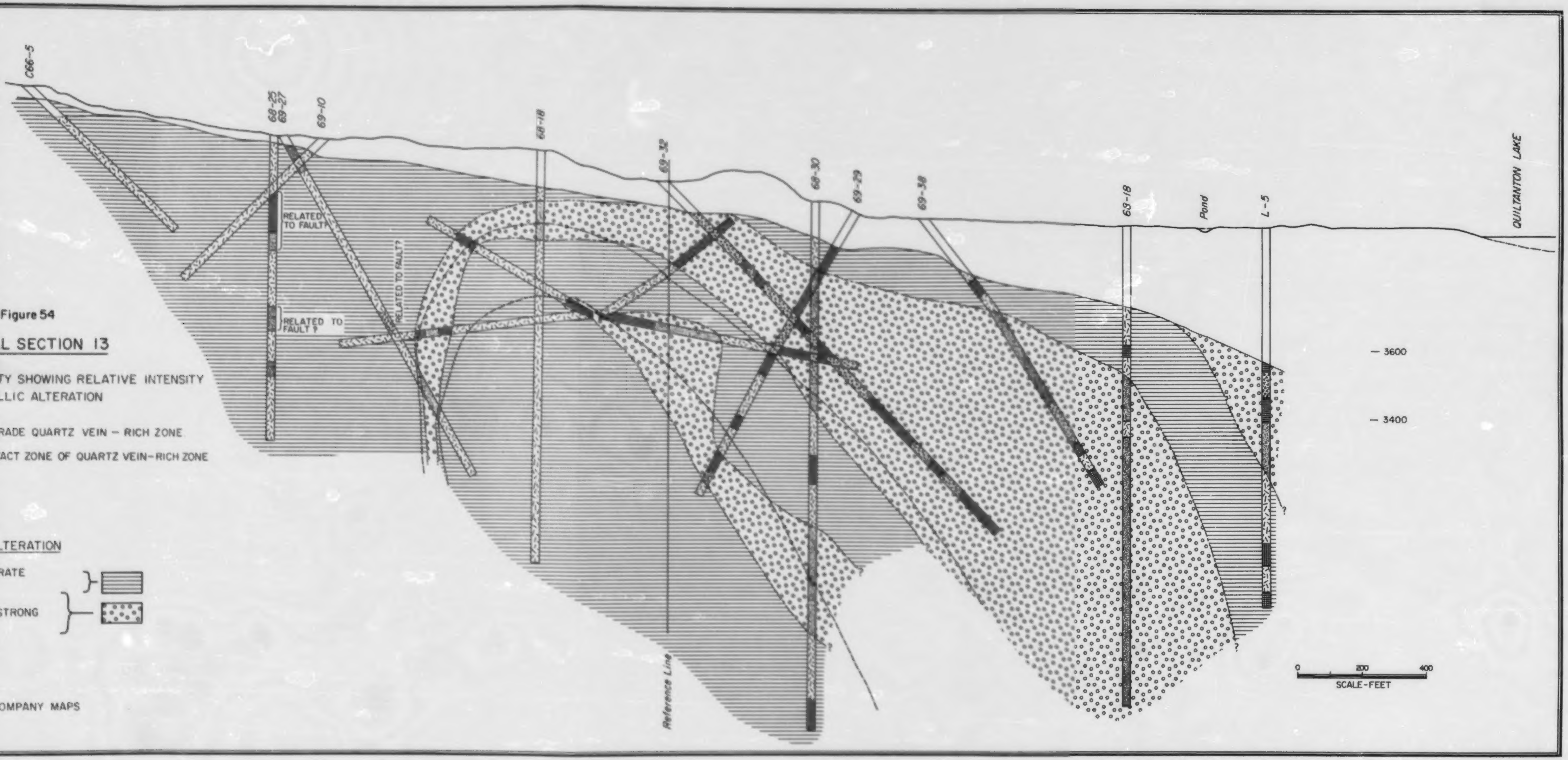


Figure 54

L SECTION 13

TY SHOWING RELATIVE INTENSITY
LLIC ALTERATION

RADE QUARTZ VEIN – RICH ZONE
ACT ZONE OF QUARTZ VEIN–RICH ZONE
LTERATION
RATE
STRONG
OMPANY MAPS
C66-5
68-25
69-27
69-10
68-18
69-32
68-30
69-29
69-38
63-18
Pond
L-5
QUILTANTON LAKE
RELATED TO FAULT?
RELATED TO FAULT ?
RELATED TO FAULT?
Reference Line
— 3600
— 3400
?
0
200
400
SCALE-FEET

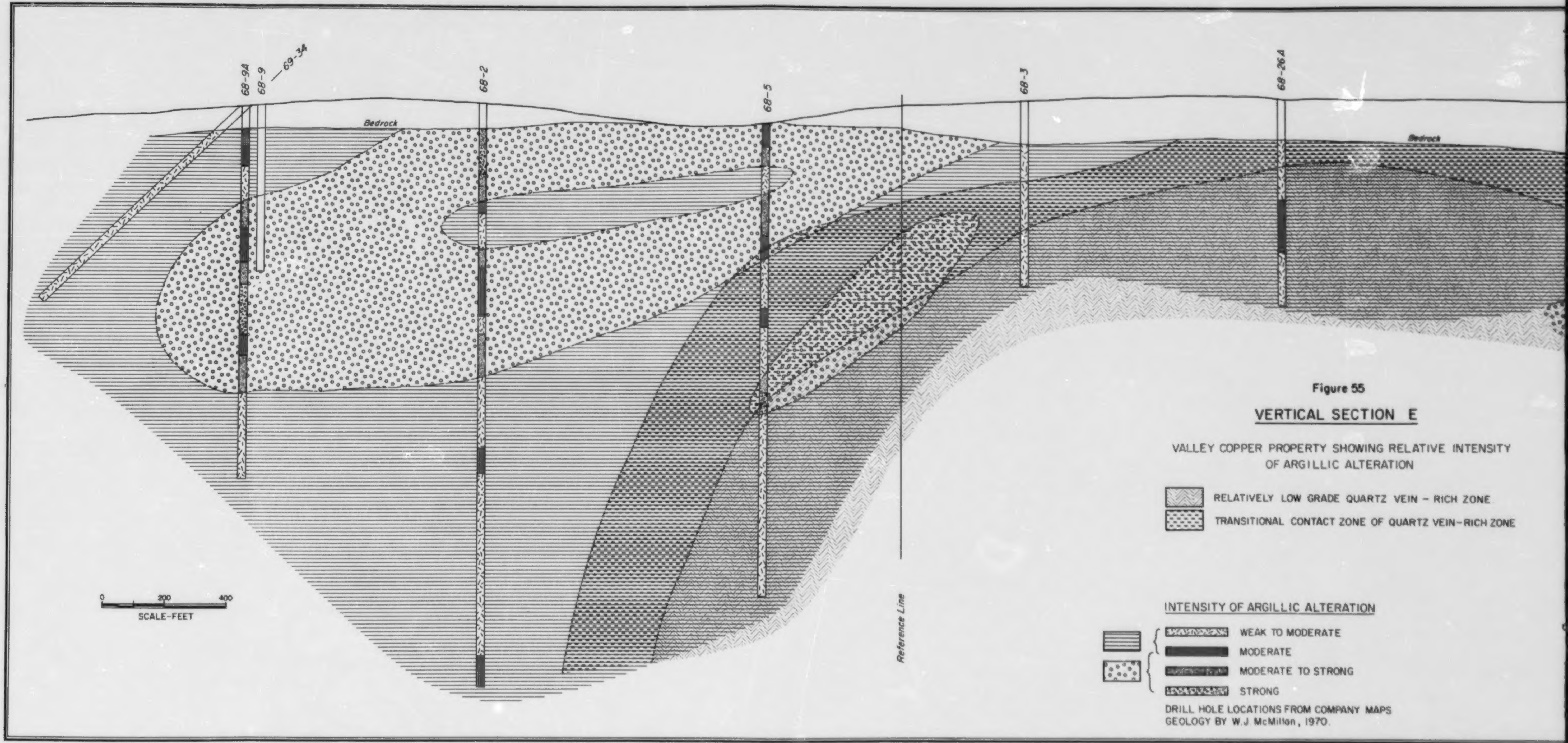

68-9A
68-9
69-34
68-2
68-5
68-3
68-26A
Bedrock
Bedrock
Reference Line
0
200
400
SCALE-FEET
RELATIVELY LOW GRADE QUARTZ VEIN - RICH ZONE
TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE
INTENSITY OF ARGILLIC ALTERATION
WEAK TO MODERATE
MODERATE
MODERATE TO STRONG
STRONG

Figure 55

VERTICAL SECTION E

VALLEY COPPER PROPERTY SHOWING RELATIVE INTENSITY OF ARGILLIC ALTERATION

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J. McMillan, 1970.

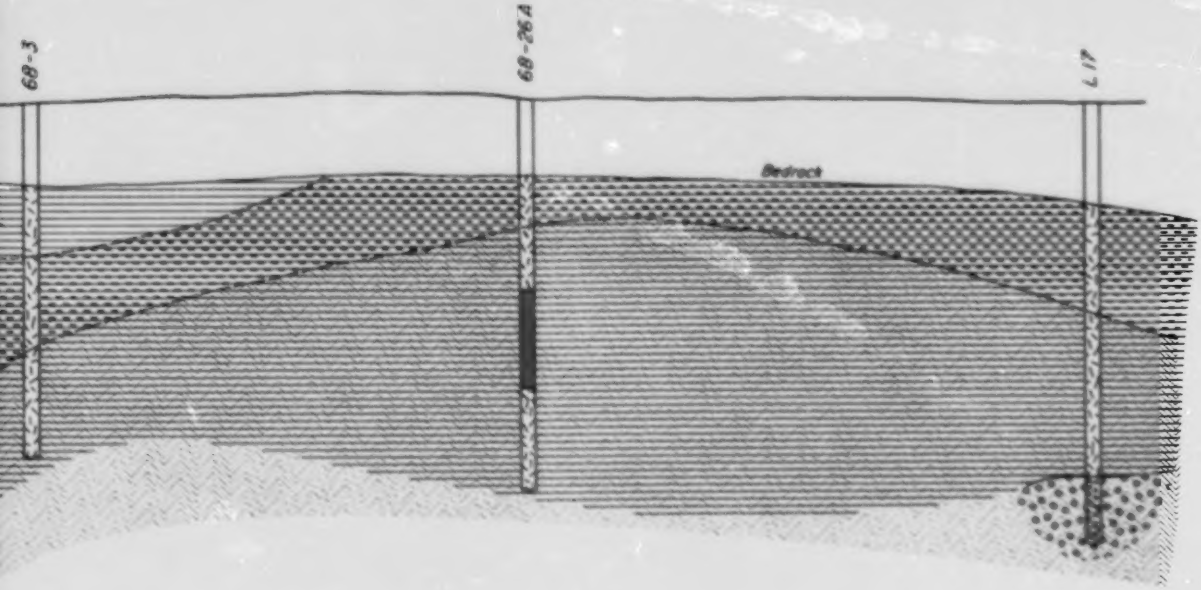


Figure 55

VERTICAL SECTION E

VALLEY COPPER PROPERTY SHOWING RELATIVE INTENSITY OF ARGILLIC ALTERATION

▨ RELATIVELY LOW GRADE QUARTZ VEIN – RICH ZONE

▨ TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE

INTENSITY OF ARGILLIC ALTERATION

▨ WEAK TO MODERATE

▨ MODERATE

▨ MODERATE TO STRONG

▨ STRONG

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J McMillan, 1970

ley faults were both active in Tertiary time, but it is not clear whether they were initiated or simply rejuvenated at that time.

Summary

Several conclusions may be drawn about fault age-relations and movements from the data:

(1) The Lornex fault was active before the Valley Copper deposit formed.

(2) Offset of the Bethsaida quartz monzonite-Bethlehem granodiorite contact indicates right lateral motion on the Lornex fault which post-dates consolidation of the Bethsaida phase.

(3) The Highland Valley fault is younger than the Bethlehem phase.

(4) The Lake fault is younger than the Bethsaida phase.

(5) Block faulting occurred (east side down, Lornex fault; northern side down, Lake and Highland Valley faults) prior to but probably not long before deposition of Tertiary volcanic and sedimentary rocks. Fault scarp erosion probably accounts for landslide deposits and the immature nature of Tertiary deltaic and lake bottom(?) sediments south of Quiltanton Lake.

(6) The time of initiation of the Lake and Highland Valley faults is uncertain.

Alteration, Veining, and Mineralization

Introduction

At Valley Copper, variations in grade are related to variations in intensity and type of veining and alteration in the host rock. Where veining is not extensive, grade is low; where quartz veining is extensive, grade is relatively low; but where quartz-sericite veining and alteration are extensive, grade is relatively high. The first condition is encountered at the gradational borders of the deposit, the second in the core of the deposit where poorly mineralized, relatively young quartz veins are abundant (Figs. 49 and 50), and the third throughout the remainder of the orebody. In the core zone, poorly mineralized quartz veins cut quartz-sericite zones and form an elongated dome with gradational contacts. As it is followed northwestward in longitudinal section (Fig. 50), the apex of the quartz-rich dome plunges gently at first and then steeply toward the northwest. The northeast flank dips northeast at about 40 degrees and the southwest flank is subvertical in transverse section (Fig. 49).

Argillic Alteration

Variation in the intensity of argillic alteration is illustrated on Figures 54 and 55 for transverse and longitudinal sections through the orebody. In section 13, moderate to intense argillic alteration is most prominent along the gently northeast-dipping flank of the quartz-rich dome. Above and southwest of the core dome, intense argillic alteration forms a thin selvage which approximately encloses the outer edge of the transitional contact of the dome. In section E, moderate to intense argillic alteration is most prominent in a gently northwest-plunging zone which extends from just above the contact of the transition zone to the edge of the orebody.

Feldspar in argillic alteration zones may be pale green, waxy green, emerald green, or chalky in shades of pale green to white. In the intensely altered chalky zones, X-ray studies reveal kaolinite and sometimes illite with sericite and carbonate. Where alteration is less intense, sericite with carbonate and sometimes chlorite pre-

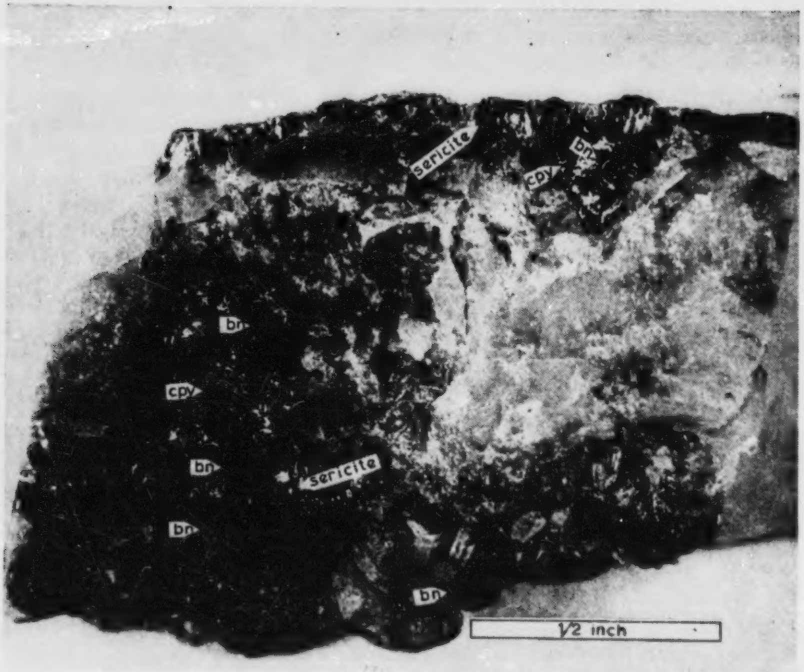


Plate XVIIA.—Quartz crystals with well-developed terminations occur in this vuggy quartz vein. Chalcopyrite (cpy) and bornite (bn) fill angular spaces in the vein. Bornite also forms crystal clusters which enclose and therefore are later than terminated quartz crystals.

dominate and X-ray diffraction photographs show no clay minerals. Primary potash feldspar was destroyed in at least some chalky alteration zones.

Biotite alteration seems to coincide approximately with argillic alteration, but was not studied in detail. In areas of low to moderate argillic alteration, biotite tends to be altered to chlorite; in areas of moderate to intense argillic alteration it tends to be altered to a mixture of sericite and carbonate. Sericite forms the body of the pseudomorph, and lensy carbonate plates lie in the biotite cleavage planes.

Veining

Four main vein types are important. These are quartz sericite sulphide, quartz ± sericite ± sulphide, quartz potash feldspar ± sericite ± sulphide, and quartz ± sulphide. Those with sericite commonly carry higher values than those with no sericite.

Quartz sericite veining—Most quartz sericite envelopes are centred by and presumably associated with quartz veins containing pods of sericite. Drill core containing quartz sericite zones but no associated quartz veins may simply have passed through a halo around a vein. Consequently, when the core was logged, quartz sericite alteration zones and quartz veins with sericite or quartz sericite halos were mapped as one entity and labelled quartz sericite veins.

The central quartz veins contain copper and to a lesser extent molybdenum sulphides as relatively late-stage crack or vug fillings (Plates XVIB and XVIIA). In addition, sulphides form angular bodies between coarse-grained sericite crystals and

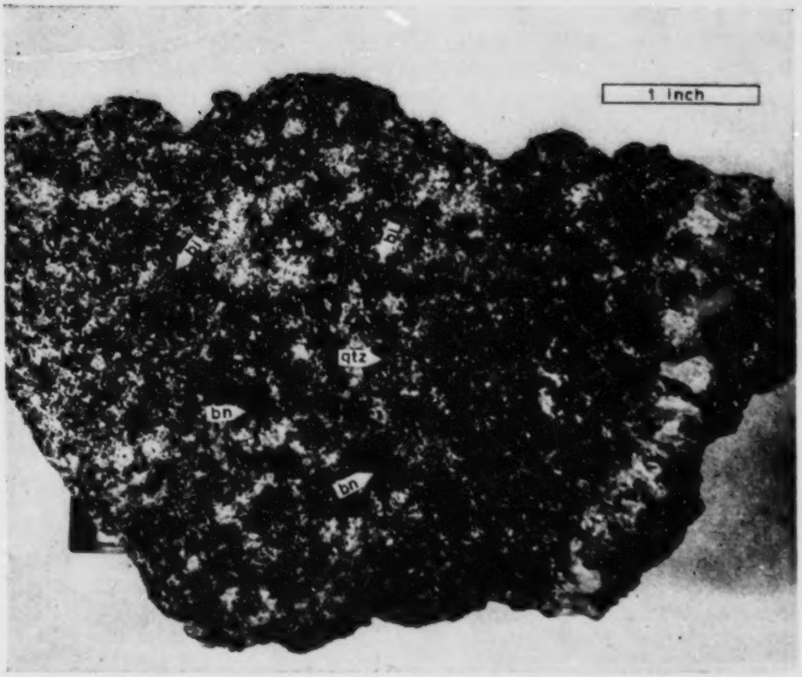


Plate XVIIB.—A vuggy quartz vein sparsely mineralized with chalcopyrite and bornite (not seen in photograph) cuts a vuggy quartz-sericite zone. Vugs may be lined with well-terminated quartz crystals (qtz) or poorly formed bornite (bn) crystals. Biotite (bi) in the specimen has altered to sericite-siderite aggregates.

line vugs in porous quartz sericite zones (Plate XVIIB). Although there are many exceptions, bornite is generally more prominent than chalcopyrite in quartz sericite veins.

Quartz sericite veins vary from quartz veins with thin coarse-grained sericite selvage to quartz veins with vuggy quartz sericite halos wider than the veins to vuggy quartz sericite zones with hairline or no apparent central quartz vein. Quartz sericite halos often contain inclusions of the host rock. Ocherous hematite is a common but not abundant coating on or filling between sericite plates. Vugs in the halos are often lined with quartz or carbonate crystals and contain copper or molybdenum sulphides. Occasionally, the copper sulphides seem to display crystal faces, although these may be moulds of quartz crystal faces. Quartz sericite halos commonly grade outward into a zone rich in potash feldspar. The rind of potash feldspar is usually less than one-half inch wide.

The episode, or more probably episodes, of quartz sericite veining and alteration represent the main ore-forming stage. In part this probably reflects the state of evolution of the ore-forming fluid and in part the fact that numerous sites chemically favourable for deposition of metallic sulphides were present. It is likely that bornite predominating over chalcopyrite indicates a shortage of sulphur and reflects the state of evolution of the ore-forming fluid.

Quartz, quartz ± sericite, and quartz potash feldspar ± sericite veining—At least two generations of quartz veins occur in the Valley Copper orebody. Earlier ones typically contain scattered pods, lenses, or selvages of sericite. Copper mineralization is more abundant in these than in younger sericite-poor veins and much of the sulphide occurs with or near the sericite. Potash feldspar and carbonate are constituents of many quartz veins, and potash feldspar may be abundant. Both hematite and pyrite occur in quartz veins, but both are uncommon. Potash feldspar alteration is common adjacent to quartz veins and locally the host rock is flooded with salmon-pink microcline. Copper sulphides commonly fill angular openings in quartz veins. Molybdenite is almost invariably smeared out along slip planes. In general, younger sericite-poor quartz veins contain more chalcopyrite than bornite.

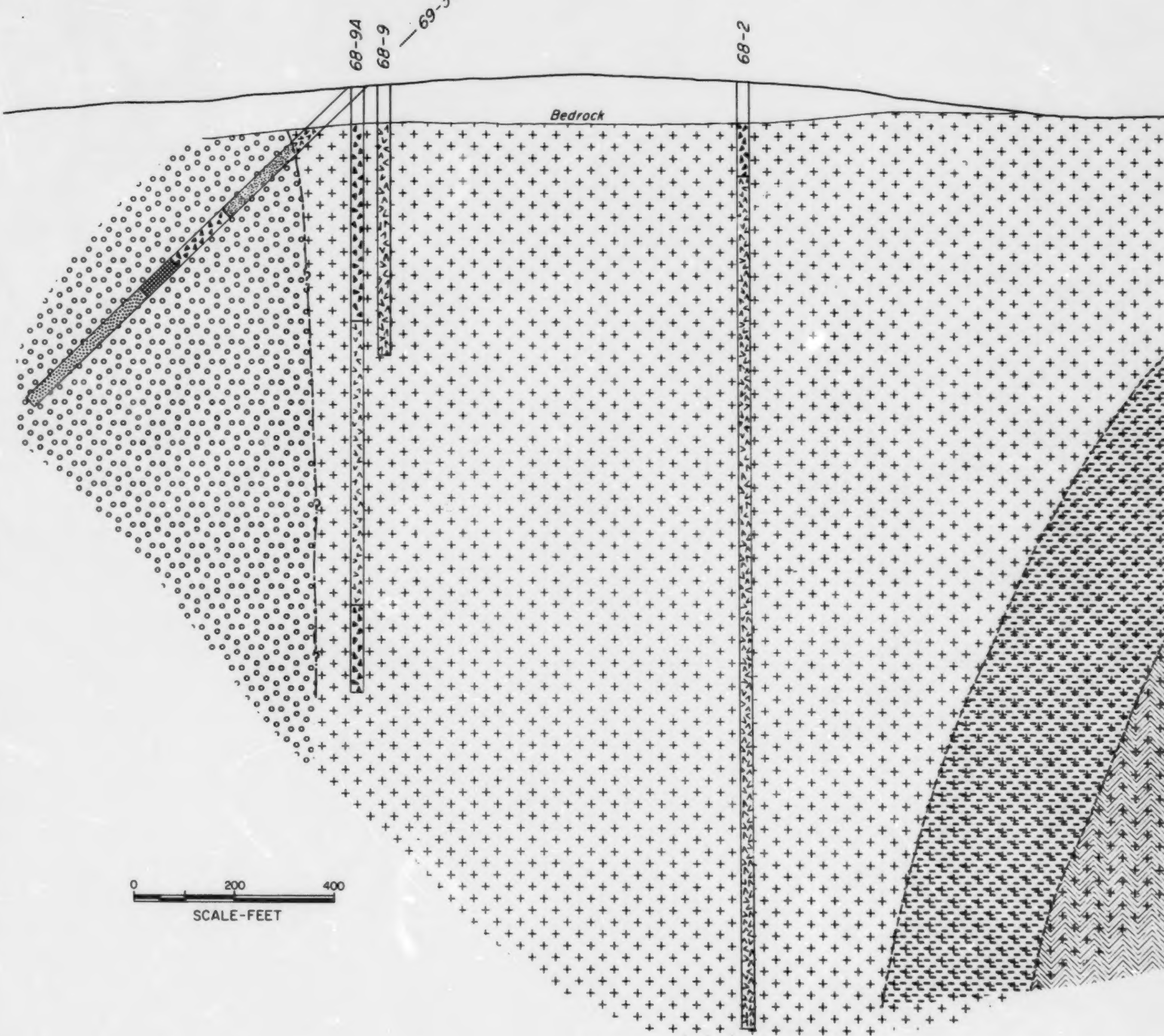
As in the quartz sericite veins, sulphides have been deposited late, in favourable sites within the quartz veins. That is, veining produced physically and chemically appropriate sites into which sulphides were deposited. Concordantly, sulphide deposition probably reflects evolutionary changes in the composition of the ore-forming fluids.

Anhydrite-gypsum veining—Gypsum veins are common below the so-called gypsum line (Figs. 49 and 50) in the Valley Copper deposit. Commonly, the gypsum is fibrous and white to orange, but locally it forms large platy crystals or it may be massive. Gypsum veins often parallel or form borders on quartz veins, but also cut both quartz and quartz sericite veins. Gypsum vein formation is apparently post-ore. However, tenuous evidence suggests gypsum veins are secondary, not late-stage primary veins. Indirect evidence is provided by anhydrite which is intimately intergrown with sericite and associated potash feldspar alteration near the bottom of at least one deep drill hole. That is, anhydrite is apparently the same age as and associated with sericitic and potassic alteration. More direct evidence is provided by quartz-gypsum veins and quartz-potash feldspar veins in which gypsum fills angular interstices. In these instances, what is now gypsum was deposited with the quartz and quartz-potash feldspar veins. Gypsum may form late-stage primary veins, but it is more likely in view of age-relationships and the spatial relationships of gypsum and earlier quartz veins that gypsum veins are secondary. It is speculated that gypsum was formed at the expense of anhydrite which was deposited from the ore-forming fluids. No evidence was seen to suggest that gypsum veins existed above the gypsum line.

The position of the gypsum line was probably controlled by the composition of the ore-forming fluids and pressure-temperature conditions. One interpretation is that it represents the level at which the ore-forming fluid was so depleted in $CaSO_4$ because of anhydrite deposition lower in the orebody that deposition ceased. A second interpretation assumes fluids were moving in a convective cycle upward through what is now the quartz-rich core zone outward then downward and back into the core zone. In this instance, composition of ore fluid rather than pressure and temperature must have controlled anhydrite deposition because the gypsum line is depressed toward higher pressure-temperature conditions in the core zone. Subsequently, anhydrite in the upper part of the deposit was hydrated and most was reconstituted as gypsum veins.

Ore Mineralogy

Chalcopyrite, bornite, and molybdenite are the typical ore minerals at Valley Copper. Common gangue minerals are quartz and sericite with ubiquitous but not abundant hematite and uncommon pyrite. Gypsum is a common accessory in the lower reaches of the deposit below the gypsum line. Lower still, gypsum is joined by anhydrite. Secondary minerals associated with the veins are sericite, carbonate (siderite and calcite), clay minerals (kaolinite and illite), chlorite, and potash feldspar (microcline).


68-9A
68-9
69-34
68-2
Bedrock
0
200
400
SCALE-FEET

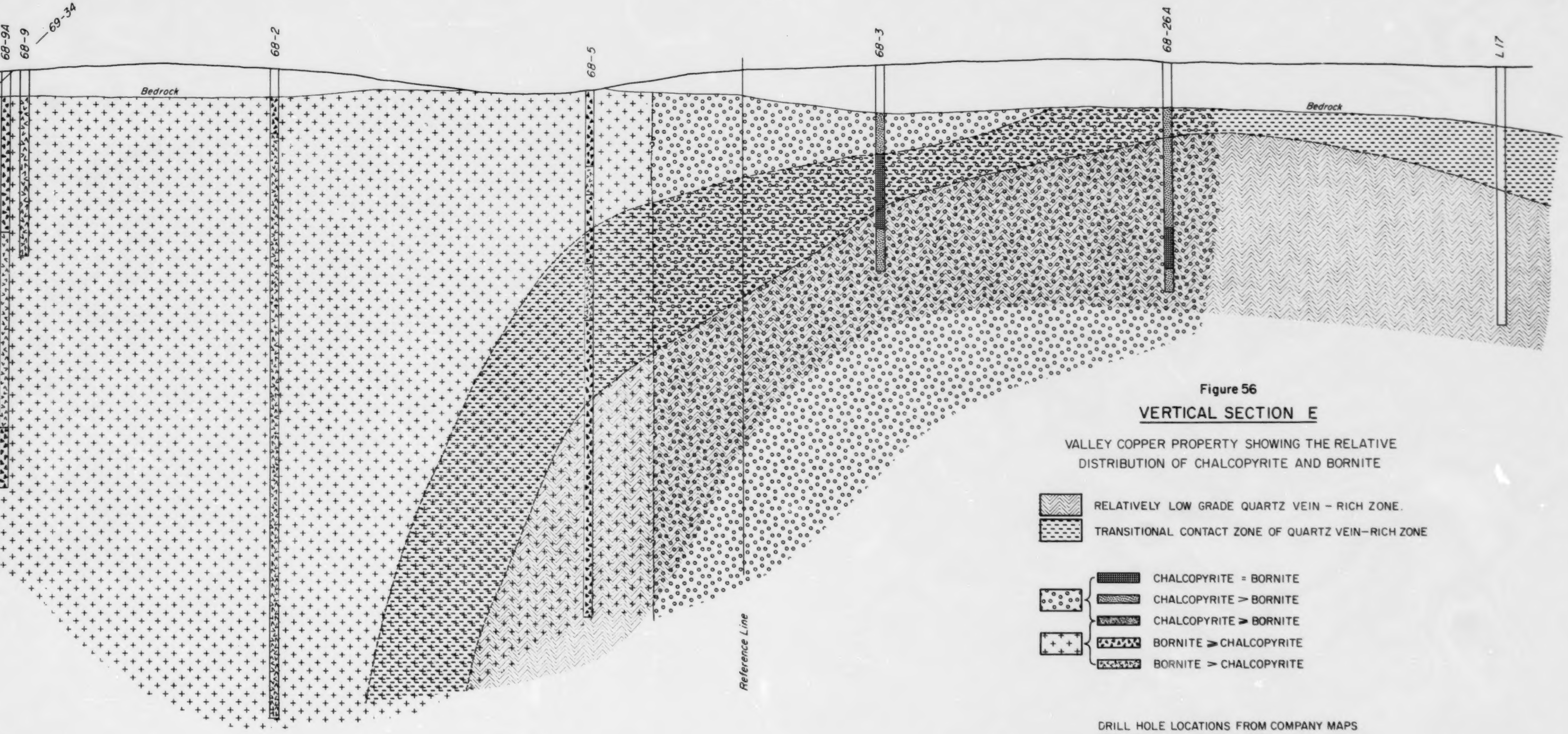

68-9A
68-9
69-34
68-2
68-5
68-3
68-26A
L17
Bedrock
Bedrock
Reference Line
▨ RELATIVELY LOW GRADE QUARTZ VEIN - RICH ZONE.
▨ TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE
CHALCOPYRITE = BORNITE
CHALCOPYRITE > BORNITE
CHALCOPYRITE ≫ BORNITE
BORNITE ≫ CHALCOPYRITE
BORNITE > CHALCOPYRITE

Figure 56

VERTICAL SECTION E

VALLEY COPPER PROPERTY SHOWING THE RELATIVE DISTRIBUTION OF CHALCOPYRITE AND BORNITE

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J. McMillan, 1970.

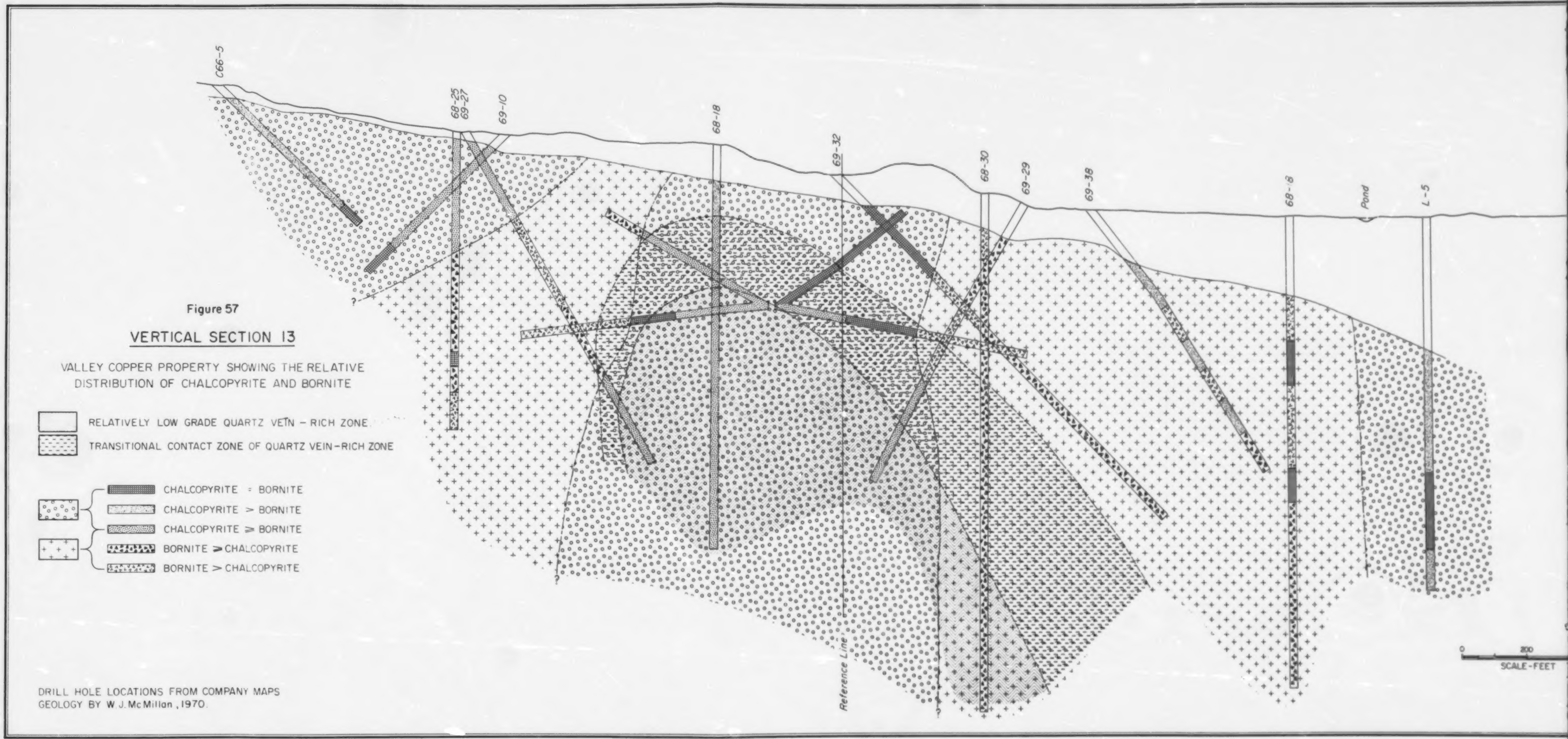
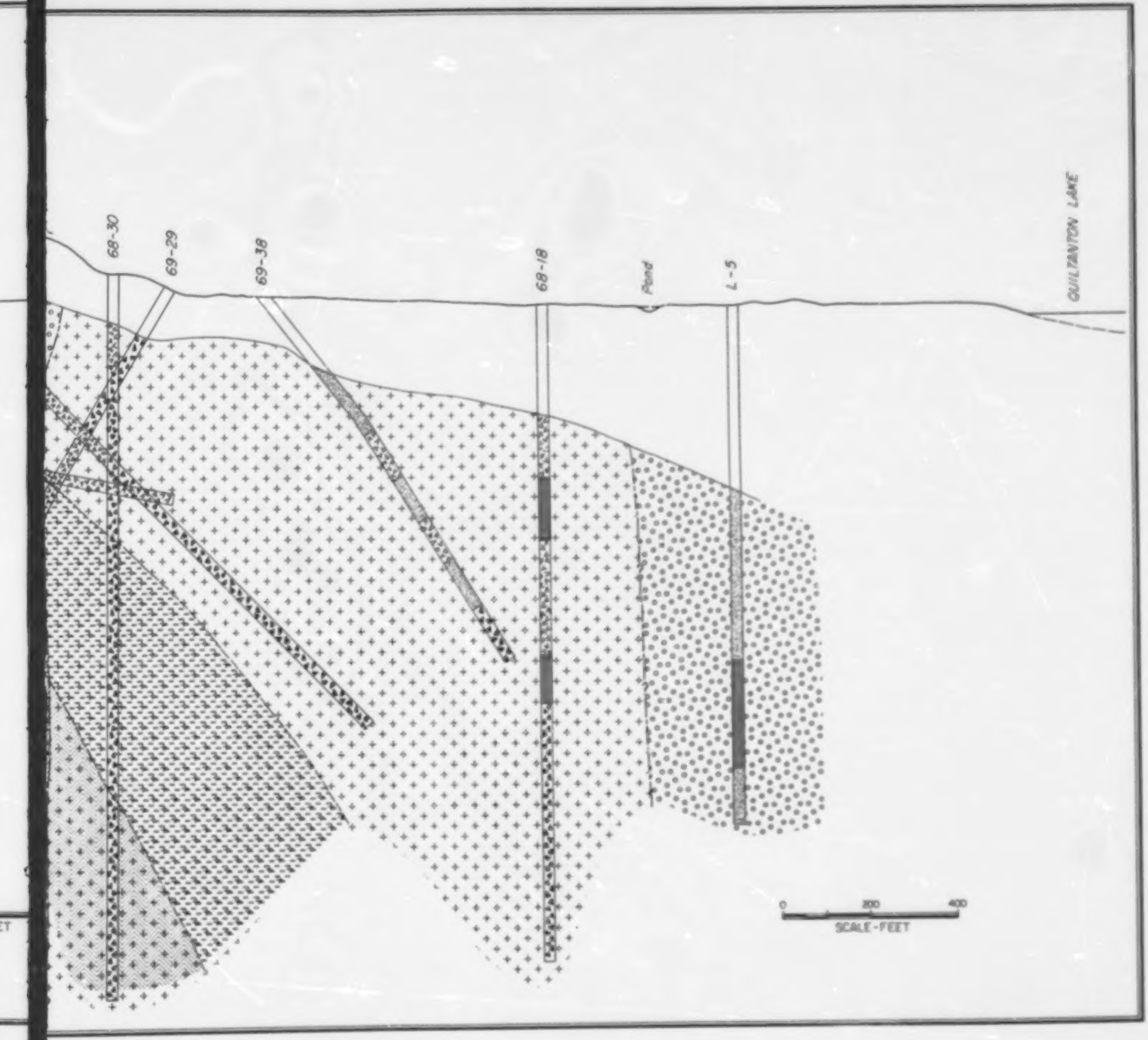

C66-5
68-25
69-27
69-10
68-18
69-32
68-30
69-29
69-38
68-8
Pond
L-5
Reference Line
?
RELATIVELY LOW GRADE QUARTZ VEIN - RICH ZONE
TRANSITIONAL CONTACT ZONE OF QUARTZ VEIN-RICH ZONE
CHALCOPYRITE = BORNITE
CHALCOPYRITE > BORNITE
CHALCOPYRITE ≥ BORNITE
BORNITE ≥ CHALCOPYRITE
BORNITE > CHALCOPYRITE
0
200
SCALE-FEET

Figure 57

VERTICAL SECTION 13

VALLEY COPPER PROPERTY SHOWING THE RELATIVE DISTRIBUTION OF CHALCOPYRITE AND BORNITE

DRILL HOLE LOCATIONS FROM COMPANY MAPS
GEOLOGY BY W.J. McMillan, 1970.


68-30
69-29
69-38
68-18
Pond
L-5
QUILTANTON LAKE
0
200
400
SCALE-FEET
ET

Petruk (1970) reported that chalcocite fills hairline cracks in bornite, and ilmenite and rutile occur as a result of biotite alteration. He also identified gold and gudmundite (iron antimony sulphide).

In the thin oxidized capping of the deposit, iron oxide, malachite, coatings of black sooty chalcocite(?), and rarely native copper occur. Throughout the oxide zone unreplaced sulphides can be found and no supergene enrichment zone was recognized.

Chalcopyrite-bornite Ratios

In section E (Fig. 56) it is seen that chalcopyrite equals or exceeds bornite in abundance along the northwest fringe of the ore and southeast of drill hole 68-5. In section 13 (Fig. 57) chalcopyrite equals or exceeds bornite on both the southwest and northeast flanks of the orebody as well as in and above the quartz-rich core zone. Chalcopyrite to bornite ratios from the centre to the edge of the deposit probably reflect chemical changes in the ore-forming fluid as it was cycled. Thus there is subtle iron zonation with iron increasing relative to copper toward the borders of the deposit. In and above the core zone chalcopyrite enrichment is attributed to the abundance of relatively young quartz veins. As was remarked elsewhere, they tend to have more chalcopyrite than bornite. It should be remembered that proportions here are qualitative; averaging the entire deposit would probably give more bornite than chalcopyrite.

Summary

It is evident from the structural data that the mineralized veins at Valley Copper occupy faults and joints which apparently formed in response to right lateral pre-ore movement on the Lornex fault. Therefore, the first event leading up to mineralization was faulting which produced conduits subsequently used by the fluids which caused dilation and pervasive argillic alteration, then quartz sericite sulphide and quartz ± sericite ± sulphide veining. Potassic alteration is associated with both quartz sericite and quartz veining. Gypsum which may be secondary after anhydrite and, in some deeper holes, anhydrite forms veins below the gypsum line.

WORK DONE: In 1970, underground exploration and bulk sampling were continued. B and C declines were driven in 1970 a total of 1,120 feet to their objective points, and the underground workings were abandoned. The sampling plant was dismantled and removed from the property. Surface diamond drilling totalled 37,488 feet and underground diamond drilling totalled 19,355 feet. The camp area and surroundings in December were partially demolished by an explosion set off inadvertently due to a leakage of propane gas from one of the camp's propane tanks. One person was injured slightly.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, K. E. Northcote, Geology and Geochronology of the Guichon Creek Batholith, Bull. 56, 1969; *Minister of Mines, B.C.*, Ann. Repts., 1967, p. 156; 1968, pp. 181, 182; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 266, 267; Allen, J. M., and Richardson, J., 1970, Geological Setting of the Valley Copper Orebody, paper delivered at *C.I.M.M.* Annual Meeting, April, 1970; *Dept. of Energy, Mines and Resources,* Mines Branch, W. Petruk, Preliminary Mineralogical Study of the Copper Molybdenum Deposit of the Valley Copper Mines Limited in the Highland Valley Area in British Columbia, IR 70-71 (Industrial Confidential), 1970.

VERA, DIA (No. 13, Fig. J)

LOCATION: Lat. 50°32–33′ Long. 121°05–07′ (92I/11E)

Between 3,750 and 3,950 feet elevation, 6 miles northwest of Lornex.

CLAIMS: VERA 1 to 10, 12 to 15, 20 to 23, 110, 160, 170; DIA 1 to 5, 7 to 9, 100; TE 1, 2 Fractions; PEARL 1 to 10; PEARL 1 Fraction.

Access: The property adjoins the Highland Valley highway on the south about 20 miles from Ashcroft.

Owner: Kel-Glen Mines Ltd.

Operator: LORNEX MINING CORPORATION LTD., Box 430, Ashcroft.

Metal: Copper.

Description: Chalcopyrite and bornite in alaskite and feldspar porphyry within granodiorite or quartz diorite. Alteration—slight, sericite, chlorite.

Work done: Induced polarization survey, 2 line-miles covering Vera 21 and 23 (part of Lornex tailings area programme).

References: Assessment Reports 1676, 1710, 2218, 2489; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 267.

NICOLA MINING DIVISION

HIGHLAND VALLEY AREA

AL (No. 69, Fig. J)

Location: Lat. 50°30′ Long. 120°20′ (92I/7W)
Between 4,700 and 5,000 feet elevation, straddling Billy Lake.

Claims: AL, totalling 40.

Access: From Ashcroft via the Highland Valley highway and 6 miles along the Billy Lake road.

Owner: BORNITE RIDGE MINES LTD., 549 Howe Street, Vancouver 1.

Metal: Copper.

Description: Quartz stringers in a shear zone in granodiorite of the Chataway phase of the Guichon Creek Batholith are mineralized with bornite.

Work done: Surface diamond drilling, three holes totalling 930 feet.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 194.

MLM, GCM, LEE (No. 2, Fig. J)

Location: Lat. 50°23–28′ Long. 120°48–51′ (92I/7W)
Between 3,200 and 4,400 feet elevation, west of Mamit Lake (a rectangular block 7 miles long north-south and 2 miles wide).

Claims: One hundred and sixty-eight, including 111 MLM; 44 GCM; LEE 6; DUDE 5, 6; ED 1 to 5.

Access: By the Mamit Lake road from Merritt.

Owner: MAMIT LAKE MINING LTD., 303, 550 Burrard Street, Vancouver 1.

Metal: Copper.

Description: Southerly section underlain by dioritic to gabbroic rocks along the eastern contact section of the Guichon Creek Batholith. Northerly and westerly sections are underlain by diorite and monzonite intruded by aplite, alaskite, and felsite dykes.

Work done: Airborne magnetometer survey, approximately 80 line-miles on MLM and GCM; ground magnetometer survey, 10.5 line-miles on MLM 54 to 58, 61, and 62; electromagnetic survey, approximately 7.5 line-miles on MLM 15 to 30, 33, and 35; induced polarization survey, approximately 4 line-miles on MLM 1 to 6, 15 to 18, 29, and 30.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 270; Assessment Reports 2246, 2247, 2472, 2633.

CHATAWAY (No. 5, Fig. J)

Location: Lat. 50°22′ Long. 120°53′ (92I/7W)
Dot Lake is approximately at the centre of the claim group which is between elevations of 4,000 and 5,000 feet.

Claims: Four hundred and sixty-six, including ANT, DOT, GAV, HOR, WIZ, DJ, JAY, LEN, PAL, REX, SHO, TDM, TOM, etc.

Access: By the Aberdeen road from Merritt, approximately 25 miles.

Owner: Chataway Exploration Co. Ltd.

Operator: AMERICAN SMELTING AND REFINING COMPANY, 504, 535 Thurlow Street, Vancouver 5.

Metal: Copper.

Description: Numerous showings occur in shear zones in various phases of the Guichon Creek Batholith. Mineralization is commonly in quartz veins with associated sericite alteration.

Work done: Surface geological mapping, 1 inch equals 500 feet on Dot, Hor, Gav, and Ant; improvement of existing roads and construction of drill access roads, 16 miles; trenching, 3,800 feet on Wiz 27, 60, Dot 6, 22, Sho 12, and Hor 6; percussion drilling, 148 holes totalling 16,950 feet on a 2,000-foot grid spacing over most of the property.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 194; Assessment Report 1790.

RWS, ISY (No. 52, Fig. J)

Location: Lat. 50°21–23′ Long. 120°46–49′ (92I/7W)
East of and over part of Mamit Lake.

Claims: RWS 1 to 120; ISY 1 to 44, 121, 122.

Access: From Merritt–Spences Bridge highway via Mamit Lake road.

Owner: EXEL EXPLORATIONS LTD., 404, 550 Burrard Street, Vancouver 1.

Description: Underlain by andesite agglomerate and tuff of the Upper Triassic Nicola Group. Well-developed shear zones are reported which contain quartz, calcite, hematite, chlorite, sericite, pyrite, and minor amounts of chalcopyrite.

Work done: On the RWS 1 to 30 and 63 to 120, 400-foot cross-lines were cut from a north base-line and stations picketed at 100-foot intervals on the cross-lines. Magnetometer readings were taken at each station.

References: Assessment Reports 2496, 2497.

HC (No. 8, Fig. J)

Location: Lat. 50°18′ Long. 120°50′ (92I/7W)
Mamit Lake, Highland Valley, 13 miles north of Merritt, at approximate elevation of 3,500 feet.

Claims: HC 3 to 7, 33, 36 to 38, 48; HC-A Fraction; HC-F Fraction; HC-O Fraction; MYRTLE 7; eight Crown grants (Lots 997, 1217, 1254, 1260, 1418, 3256, 4208, 4209).

Access: By Mamit Lake road from Merritt, 15 miles.

Owner: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Granodiorite and related intrusives of the Guichon Creek Batholith.

Work done: Percussion drilling, three holes totalling 470 feet on HC 36, 48, and HC-F Fraction.

Reference: Assessment Report 1557.

TOP (No. 20, Fig. J)

Location: Lat. 50°16.5′ Long. 120°53.5′ (92I/7W)
At approximately 4,500 feet elevation in the area around Gordon, Abbott, and Tyner Lakes.

Claims: TOP, totalling 65.

Access: By road from Merritt, 12 miles.

Owner: LAKE BEAVERHOUSE MINES LIMITED, 1024, 85 Richmond Street West, Toronto 1, Ont.

Metal: Copper.

Description: Underlain by rocks of the Highland Valley phase of the Guichon Creek Batholith.

Work done: Surface geological mapping on all claims; electromagnetic survey, approximately 4 line-miles covering all claims; induced polarization survey, approximately 3 line-miles covering 30 claims and fractions; trenching, 525 feet on selected claims; road construction, 7,200 feet.

References: Assessment Reports 2222, 2720.

GO (No. 43, Fig. J)

Location: Lat. 50°15′ Long. 120°50.5′ (92I/7W, 2W)
East side of Guichon Creek, just north of the mouth of Steffens Creek, 10 miles north-northwest of Merritt.

Claims: GO 1 to 6, GO 1 and 2 Fractions.

Access: From Merritt–Spences Bridge highway and Mamit Lake road.

Owner: G. OLHEISER, 696 West 45th Avenue, Vancouver 13.

Work done: An electromagnetic survey was carried out along 10 east-west grid lines and three north-south control lines. Grid lines are 500 feet apart and stations 75 feet.

Reference: Assessment Report 2410.

COQUIHALLA LAKE

LAVERNE, CAP (No. 20, Fig. H)

Location: Lat. 49°39.3′ Long. 121°00.6′ (92H/11E)
At 4,700 feet elevation, astride old Kettle Valley Railway right-of-way, 1½ miles north of Coquihalla Lake.

Claims: LAVERNE 1 to 6, JOAN, JAME, HELEN, EVA, GALE, MARY, CAP 1 to 4, 16 in all.

Access: From the old Kettle Valley Railway right-of-way, 38 miles south of Merritt.

Operator: BLUEBERRY MINING CO. LTD., 52 Yates Avenue, Chilliwack.

Metals: Silver, lead, zinc, copper.

Work done: Trenching, 900 feet on the Laverne 3 and 4; line-cutting, 5,000 feet on all 16 claims.

TEKA (No. 92, Fig. H)

Location: Lat. 49°38′ Long. 120°58.2′ to 121°00′ (92H/10W)
See report on this property, page 251.

JM (No. 65, Fig. H)

Location: Lat. 49°44′ Long. 121°04′ (92H/11E)
On Juliet Creek, 7 miles northwest of Coquihalla Lake, between 3,600 and 5,000 feet elevation.

Claims: Twenty JM claims and fractions.

Access: By poor road up the north side of Juliet Creek from Coldwater River road.

Owners: K. W. LIVINGSTONE and J. S. CHRISTIE, 827 Claybrook Road, Richmond.

Metals: Molybdenum, copper.

Work done: Geochemical soil survey and ground magnetometer survey.

Reference: Assessment Report 2610.

SPIUS CREEK

GOSSAN, RA, BUD (No. 108, Fig. H)

Location: Lat. 49°53.8–56.5′ Long. 121°14–17′ (92H/14E, 14W)
Between 4,000 and 5,500 feet elevation, approximately 22 miles southwest of Merritt, at the headwaters of Spius Creek.

Claims: GOSSAN 1 to 25; RA 1 to 15; BUD 1 to 33; SKY 1, 2; ROSE 1, 2; X 1 to 3 Fractions.

Access: From Merritt by road, 40 miles.

Owner: ARROW INTER-AMERICA CORPORATION, 304, 535 Thurlow Street, Vancouver 5.

Metals: Copper, molybdenum.

Description: Chalcopyrite and molybdenite along fractures and associated with quartz stringers in a brecciated granite monzonite which in places exhibits chloritization, sericitization, and kaolinization of feldspars.

Work done: Claims, topography, and surface workings mapped in part; surface geological mapping, 1 inch equals 200 feet on Gossan 1 to 16; induced polarization survey covering Gossan 1 to 11; geochemical soil survey, 100 samples covering Gossan 1 to 11.

MERRITT

CRAIGMONT MINE (No. 148, Fig. H)

By David Smith

Location: Lat. 50°12.5′ Long. 120°55.7′ (92I/2W)
Between 3,800 and 4,200 feet elevation at the forks of Birkett Creek, 8 miles north of Merritt.

Claims: The Craigmont orebodies are on the MERRELL 7 and 8 and McLEOD 5 and 6 claims. The company holds 106 mineral claims and fractions, 32 of which comprise 10 mineral leases.

Access: By road north from Highway 8 and Lower Nicola.

Owner: CRAIGMONT MINES LIMITED, 700, 1030 West Georgia Street, Vancouver 5; mine address, Box 3000, Merritt.

Metal: Copper (*see* Table 1 for production).

Work done:

Mining and milling operations were continuous in 1970. Copper concentrates are loaded at Coyle Siding and hauled by Canadian Pacific Railway to Vancouver for shipment to Japan. Shipments of magnetite concentrate commenced in 1970.

Underground work consisted of lateral development, 21,291 feet; raising, 454 feet; borehole raises, 2,868 feet; diamond drilling.

In 1970 the ventilation system was modified to meet the demand of increasing number of diesel units underground. This work included driving of ventilation drifts, raises, and the addition of several new fans.

At the mill a 600-kva. 4,160–550-volt three-phase substation was built on the north side of the mill. This station supplies a motor control centre in the concentrator.

The 75-kw. diesel-driven generator for emergency power was moved from the powerhouse and installed in the mill. Two 112.5-kva. 4,160–550-volt three-phase transformers were added to substation No. 36. On 339 level, a similar addition was made to substation No. 20 on 3060 level. Two 500-horsepower ventilating fans were installed on 2400 level and 3060 level. Seven secondary ventilating fans were installed underground. A new 112.5-kva. 4,160–550-volt three-phase transformer station was installed at No. 1 East on 3500 level. Two mine air-heaters were added to the air-heating equipment at 2400 and 3060 portals. A mobile 225-kva. 4,160–550-volt substation was used to supply a raise-boring machine with power.
REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 271, 272.

RON (No. 5, Fig. H)

LOCATION: Lat. 50°14′ Long. 120°59′ (92I/2W)
At 5,000 feet elevation 2 miles north of the Craigmont mine, 6 miles northwest of Lower Nicola.
CLAIMS: RON 1 to 8.
ACCESS: By road from the Craigmont mine, 3 miles.
OWNER: POLARIS MINES LIMITED, 703, 535 Thurlow Street, Vancouver 5.
METAL: Copper.
DESCRIPTION: The property is in the Guichon Creek Batholith.
WORK DONE: Magnetometer survey, 7.5 line-miles on Ron 1 to 8; geochemical survey, 211 samples on Ron 1 to 8; stripping, 30,000 square feet on Ron 3, 4, and 5; percussion drilling, three holes totalling 900 feet on the Ron 3, 4, and 5.
REFERENCES: Assessment Reports 374, 1138, 2713.

SMOKIE, ACA, CON (No. 118, Fig. H)

LOCATION: Lat. 50°18.4–20.7′ Long. 118°36.5–40.3′ (92I/7E)
At Helmer Lake, 2 to 3 miles northeast of Swakum Mountain.
CLAIMS: SMOKIE, ACA, CON.
ACCESS: From Mamit Lake road by dirt road along power-line from Rey Creek ranch.
OPERATOR: RONRICO EXPLORATIONS LTD., 404, 510 West Hastings Street, Vancouver 2.
METALS: Lead, zinc, copper.
WORK DONE: Geochemical soil survey, 969 samples; ground magnetometer survey, 44.5 line-miles.
REFERENCE: Assessment Report 2715.

ST (No. 118, Fig. H)

LOCATION: Lat. 50°18.8′ Long. 120°38′ (92I/7E)
Adjoining Helmer Lake to the east, 1 mile northeast of Swakum Mountain.
CLAIMS: ST 1 to 40.
ACCESS: Via Mamit Lake, Rey Creek, and British Columbia Hydro power-line roads, thence by trail.

Operator: RICHROCK MINES LTD., 1037 West Broadway, Vancouver 9.
Metal: Copper.
Work done: Ground magnetometer survey.
Reference: Assessment Report 2811.

DAL, FAD (No. 94, Fig. H)

Location: Lat. 50°15–18.5′ Long. 120°33.1–36.5′ (92I/7E)
At approximately 4,500 feet elevation around Mab and Conant Lakes, 20 miles northeast of Merritt.

Claims: DAL 1 to 80, FAD 1 to 48.

Access: Via Clapperton Creek and Pleasant Valley from Merritt, 15 to 20 miles.

Owner: NEW INDIAN MINES LTD., 616, 850 West Hastings Street, Vancouver 1.

Metal: Molybdenum.

Description: Molybdenite associated with quartz stringers along fractures in Nicola Batholith granite and granodiorite.

Work done: Magnetometer survey, 115 line-miles and geochemical soil survey, 3,246 samples covering all claims.

Reference: Assessment Report 2783.

COKE (No. 86, Fig. H)

Location: Lat. 50°16′ Long. 120°38′ (92I/7E)
Between 4,000 and 5,000 feet elevation, on and near Clapperton Creek, 2 to 3 miles east of Swakum Mountain, 15 miles northeast of Merritt.

Claims: COKE 1 to 21, 23, 25, 27, 23 to 30.

Access: By road from Nicola, 10 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metal: Copper.

Description: Minor chalcopyrite, pyrrhotite, pyrite, magnetite, and specularite in Nicola volcanics, dioritic rocks of central Nicola Batholith, gneissic rocks, and aplite dykes.

Work done: Road construction, one-half mile on Coke 3 and 4; trenching, 1,210 feet on Coke 3, 4, 10, and 20.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 271.

MA (No. 79, Fig. H)

Location: Lat. 50°17.3–20′ Long. 120°39.5–40.8′ (92I/7E)
At 5,500 feet elevation on east slope of Swakum Mountain, about 13 miles north-northeast of Merritt.

Claims: MA 1 to 30.

Access: By 10 miles of dirt road up Clapperton and Shuta Creeks from Nicola.

Owner: POMONA DEVELOPMENT LTD., Fourth Floor, Two Bentall Centre, Vancouver 1.

Work done: Soil sample geochemical survey.

Reference: Assessment Report 2635.

MIKE (No. 69, Fig. H)

LOCATION: Lat. 50°08.9–09.8′ Long. 120°46.8–48.8′ (92I/2W)
South of Jesse Creek, adjoining Indian Reserve 1 on the east, 3½ miles north of Merritt.

CLAIMS: MIKE 1 to 20.

ACCESS: By road from Merritt.

OPERATOR: SILVER KEY EXPLORATIONS LTD., Calgary, Alta.

METAL: Copper.

DESCRIPTION: Iron and copper mineralization in fracture and brecciated zones in Nicola volcanics near intrusive contact.

WORK DONE: Ground magnetometer survey.

REFERENCE: Assessment Report 2466.

WOG, FOG, BOG, LOG (No. 31, Fig. H)

LOCATION: Lat. 49°59.1′ Long. 120°53.3′ (92H/15W)
At approximately 5,000 feet elevation on the west slope of Selish Mountain, 9 miles southwest of Merritt.

CLAIMS: WOG 1 to 10, FOG 1 to 10, BOG 1 to 10, LOG 1 to 10.

ACCESS: By logging-road from Merritt, 16 miles.

OPERATOR: NICANEX MINES LTD., 821, 602 West Hastings Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Chalcopyrite and molybdenite occur disseminated in quartz diorite.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 3 line-miles; geochemical soil survey, 400 samples; percussion drilling, nine holes totalling 1,000 feet, all on the Wog claims.

GEO (No. 89, Fig. H)

LOCATION: Lat. 49°58.6′ to 50°01′ Long. 120°47–51.6′ (92H/15W, 92I/2W)
Between 4,000 and 5,000 feet elevation, 9 miles south of Merritt, on the slopes of Selish Mountain.

CLAIMS: GEO 1 to 118, 123, 124.

ACCESS: By Coldwater road from Merritt, 10 miles.

OWNER: CRAIGMONT MINES LIMITED, Box 3000, Merritt.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on all claims; magnetometer survey, 8.5 line-miles and geochemical soil survey, 500 samples covering Geo 85, 86, 103, 104, 115, and 117.

MAKELSTIN (No. 126, Fig. H)

LOCATION: Lat. 50°02.5′ Long. 120°46′ (92I/2E, 2W)
On Iron Mountain, 5 miles south-southeast of Merritt.

CLAIMS: MAKELSTIN, totalling 56.

ACCESS: From Merritt via Coldwater road and microwave tower road, about 15 miles.

OWNER: ACAPLOMO MINING & DEVELOPMENT CO. LTD., 1250, 505 Burrard Street, Vancouver 1.

WORK DONE: Ground magnetometer survey, 10.1 line-miles covering Makelstin 3, 4, 21A, 22A, 50, 57 to 60; electromagnetic survey, 6.1 line-miles covering Makelstin 4, 57 to 60; trenching, 23 feet on Makelstin 22A; surface diamond drilling, two holes totalling 154 feet on Makelstin 6 and 31.

REFERENCES: Assessment Reports 2757, 2817.

OIL, GAS, SAG (No. 2, Fig. H)

LOCATION: Lat. 50°10.8–12.6′ Long. 120°43.1–44.2′ (92I/2E)
At 3,700 to 4,900 feet elevation, 3 miles northwest of Nicola.

CLAIMS: GAS 1 to 17, OIL 1 to 12, SAG 1 to 3 Fractions.

ACCESS: By all-weather road from Nicola, 5 miles.

OWNER: TOPPER MINING LTD., Box 722, Station A, Vancouver 1.

METAL: Copper.

DESCRIPTION: Underlain by Nicola Group volcanic rocks, granodiorite, and quartz diorite.

WORK DONE: Topographic mapping; surface geological mapping, 1 inch equals 400 feet on the Oil and Gas claims; soil sampling, approximately 350 samples on the Oil, Gas, and Sag Fractions.

REFERENCE: Assessment Report 2704.

QUILCHENA

MAG (No. 25, Fig. H)

LOCATION: Lat. 50°09.3–11′ Long. 120°26–29.3′ (92I/1W)
At approximately 2,500 feet elevation, at the southeast corner of Nicola Lake, adjoining Nicola Lake Indian Reserve 1 to the south.

CLAIMS: MAG 1 to 53.

ACCESS: By road from Highway 5, one-quarter mile.

OWNER: COMINCO LTD., 800, 1155 West Georgia Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Upper Triassic Nicola Group rocks, principally volcanics with minor sedimentary rocks, are intruded by a small quartz monzonite stock of Jurassic or later age. Minor chalcopyrite and bornite occur near the eastern contact of the stock.

WORK DONE: Chain and compass survey, 1 inch equals 500 feet; ground magnetometer survey, 11 line-miles on Mag 1, 2, and 17 to 35 claims; geochemical soil survey, 556 samples on Mag 1, 2, and 17 to 35 claims; percussion drilling, five holes totalling 1,000 feet on the Mag 17, 19, 20, and 21 claims.

REFERENCES: Assessment Reports 2563, 2564.

CW (No. 71, Fig. H)

LOCATION: Lat. 50°03–08′ Long. 120°25.2–29.4′ (92I/1W)
At 3,000 to 4,000 feet elevation, 2 to 6 miles southeast of Quilchena.

CLAIMS: One hundred and forty CW claims.

ACCESS: From Highway 5 at Nicola Lake via Minnie Lake road, 2 to 6 miles.

OWNER: CRAIGMONT MINES LIMITED, Box 3000, Merritt.

DESCRIPTION: Minor disseminated chalcopyrite and pyrite in gently folded and altered Nicola Series rocks, adjacent to Jura-Cretaceous dioritic intrusions.

WORK DONE: Surface geological mapping, 1 inch equals one-half mile; magnetometer survey, 45 line-miles; induced polarization survey, 7 line-miles covering all claims; surface diamond drilling, two holes totalling 713 feet on CW 17 and 149.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 274; Assessment Report 2520.

SUNNY BOY (No. 119, Fig. H)

LOCATION: Lat. 50°07.9′ Long. 120°31.3′ (92I/2E)
West side of Quilchena Creek, 1½ to 2 miles south of Quilchena.

CLAIMS: SUNNY BOY, SONNY BOY, SHANNON, JOE, etc.

ACCESS: From Quilchena by road, 1 to 2 miles.

OWNER: QUILCHENA MINING & DEVELOPMENT CO. LTD., 10, 815 West Hastings Street, Vancouver 1.

WORK DONE: Ground magnetometer and geochemical soil sample surveys.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 169 (*see* Quilchena, Ensign, Ingersoll, etc.); Assessment Report 2750.

ASPEN GROVE

WILL (No. 39, Fig. H)

LOCATION: Lat. 50°00–02.8′ Long. 120°32.8–35.3′ (92I/2E)
Approximately 11 miles south-southwest of Quilchena, adjoining Indian Reserve 7 to the southwest.

CLAIMS: WILL, totalling 50.

ACCESS: From Merritt by road.

OWNER: Willesmar Development Co. Ltd.

OPERATOR: BETHLEHEM COPPER CORPORATION LTD., 1055 West Hastings Street, Vancouver 1.

WORK DONE: Percussion drilling, 10 holes totalling 1,820 feet.

MINT (No. 39, Fig. H)

LOCATION: Lat. 50°02′ Long. 120°32′ (92I/2E)
At approximately 3,000 feet elevation, 12 miles southeast of Merritt, adjoining Indian Reserve 7 to south on Quilchena Creek, about 8 miles south of Quilchena.

CLAIMS: MINT 1 to 8, 13 to 50, 55 to 60, 63 to 65, 67 to 110, SWAN 1.

ACCESS: By road from Merritt, 17 miles.

OPERATOR: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Principal host rocks are diorite and monzonite. Pyrite and chalcopyrite occur in association with fractures and as disseminations. Sericite, epidote, and silicification are the principal alteration products.

WORK DONE: Surface diamond drilling, three holes totalling 1,158 feet on Mint 73 and 75; percussion drilling, 16 holes totalling 3,145 feet on Mint 15, 21, 22, 32, 33, 42, 47, 69, 72, 75 to 77, 82, 87, 89, and 91.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 274.

DOR (No. 70, Fig. H)

LOCATION: Lat. 49°59.7′ to 50°01.4′ Long. 120°34.6–37′ (92I/2E, 92H/15E)
Around Courtenay Lake on Highway 5, 11 miles southeast of Merritt.

CLAIMS: DOR 1 to 34.

ACCESS: Highway 5 from Merritt.

OPERATOR: TANJO MINES LTD., 901, 900 West Hastings Street, Vancouver 1.

WORK DONE: EM-16 electromagnetic survey over 18.5 line-miles.

REFERENCE: Assessment Report 2481.

JUNE (No. 23, Fig. H)

LOCATION: Lat. 49°58.8′ Long. 120°33.4′ (92H/15E)
At 3,400 feet elevation, 8 miles northeast of Aspen Grove.
CLAIMS: JUNE 1 to 16.
ACCESS: By road from Aspen Grove, 8 miles.
OWNER: BALLINDERRY EXPLORATIONS LTD., 1108, 1111 West Hastings Street, Vancouver 1.
METAL: Copper.
DESCRIPTION: Pyrite, pyrrhotite, chalcopyrite, and magnetite disseminated in Nicola volcanics.
WORK DONE: Trenching, 3,000 feet on the June 1 to 4, 6, and 3 and 4 Fractions.

AU (No. 155, Fig. H)

LOCATION: Lat. 49°58.9′ Long. 120°30.5′ (92H/15E)
Adjoining Pothole Lake to east, 6 miles northeast of Aspen Grove.
CLAIMS: AU 1 to 20.
ACCESS: From Merritt by road, 30 miles.
OPERATOR: CONWEST EXPLORATION COMPANY LIMITED, Tenth Floor, 85 Richmond Street West, Toronto 1, Ont.
METAL: Gold.
DESCRIPTION: Altered hornblende diorite dyke or sill in fragmental porphyritic lava contains disseminated gold.
WORK DONE: Reconnaissance surface geological mapping on Au 2 to 4; stripping, 35,000 square feet on Au 3.

DUD (No. 40, Fig. H)

LOCATION: Lat. 49°56.4′ Long. 120°34′ (92H/15E)
Between 3,000 and 3,500 feet elevation, 2 miles east of Aspen Grove, 1 mile due north of Alleyne Lake.
CLAIMS: DUD 1 to 13, 1 Fraction.
ACCESS: By gravel road from Aspen Grove, 5 miles.
OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.
METAL: Copper.
WORK DONE: Geological mapping, 1:50,000; percussion drilling, 10 holes totalling 2,700 feet.

DOTE (No. 57, Fig. H)

LOCATION: Lat. 49°57′ Long. 120°36′ (92H/15E)
Aspen Grove, straddling Highway 5, approximately 1 mile north of Kidd Lake, about 16 miles south of Merritt.
CLAIMS: DOTE 1 to 9, 11 to 37.
ACCESS: By Highway 5.
OWNER: DAWOOD MINES LIMITED, 410, 355 Burrard Street, Vancouver 1.
METALS: Copper, molybdenum.
WORK DONE: Ground magnetometer, EM-16 electromagnetic, and soil sample geochemical surveys.
REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 276; Assessment Report 2468.

TIN (No. 90, Fig. H)

LOCATION: Lat. 49°56–58.4′ Long. 120°38.3–42.8′ (92H/15E)
At approximately 4,400 feet elevation, about 1 mile southeast of Harmon Lake, between Highway 5 South and the Kane Valley road, about 6 miles north-northeast of Aspen Grove.

CLAIMS: TIN 25 to 60, 62 to 80.

ACCESS: By Highway 5 South, from Merritt, 14 miles.

OWNER: CRAIGMONT MINES LIMITED, Box 3000, Merritt.

DESCRIPTION: Favourable structural formation.

WORK DONE: Surface geological mapping, 1 inch equals one-half mile; geochemical soil survey, 600 samples covering all claims.

HH, MIX (No. 63, Fig. H)

LOCATION: Lat. 49°54.8′ Long. 120°36.2′ (92H/15E)
One mile southeast of Kidd Lake, about 3 miles southeast of Aspen Grove Post Office.

CLAIMS: Unclear, much overstaking in this area.

ACCESS: By road from Aspen Grove.

OWNER: ASPEN GROVE MINES LTD., 826, 510 West Hastings Street, Vancouver 2.

METAL: Copper.

WORK DONE: EM-16 electromagnetic and geochemical soil surveys.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 276; Assessment Report 2581.

A (No. 41, Fig. H)

LOCATION: Lat. 49°50.4–55.8′ Long. 120°27.7–32′ (92H/15E, 16W)
At approximately 3,500 feet elevation, 4½ miles east-southeast of Aspen Grove, 1¼ to 3 miles due east of Kentucky Lake.

CLAIMS: A, 234 in all.

ACCESS: By gravel road from Merritt–Princeton highway, 6 miles.

OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

WORK DONE: Geological mapping, 1:50,000; road constructed, 2 miles; percussion drilling, 26 holes totalling 4,400 feet.

PINE, SNOW, RON (No. 16, Fig. H)

LOCATION: Lat. 49°57′ to 50°00.5′ Long. 120°17–21′ (92H/16W)
At 4,000 feet elevation, 28 miles southeast of Quilchena store, at the junction of the Paradise Lake and Pennask Lake roads.

CLAIMS: Thirty-two PINE, 49 SNOW, 6 RON Fractions.

ACCESS: By road from Quilchena, 28 miles.

PRINCIPALS: PATRICK PETROLEUM COMPANY and DEKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

WORK DONE: Claim survey, 1 inch equals 800 feet; surface geological mapping, 1 inch equals 800 feet; induced polarization survey, 5 line-miles; soil sampling, 1,000 samples on the Pine, Snow, and Ron Fractions.

WHITEROCKS MOUNTAIN

JOHN, GROUSE (No. 131, Fig. H)

LOCATION: Lat. 50°02.1′ Long. 119°55.6′ (92L/4W)
At approximately 5,500 feet elevation, about 15 miles northwest of Kelowna, west of Whiterocks Mountain.

CLAIMS: JOHN 1 to 32, GROUSE 1 to 22.

ACCESS: From Kelowna by road, approximately 24 miles.

OWNER: TRADEWINDS INTERNATIONAL EXPLORATION LIMITED, 3028 West Broadway, Vancouver 8.

METAL: Copper.

WORK DONE: Photogeological and surface geological mapping covering all claims.

TIC, TOC (No. 100, Fig. H)

LOCATION: Lat. 49°52.9–59.7′ Long. 119°52.3–58.3′ (82E/13W)
See report on this property, page 390.

TEE, LITE, BERN (No. 88, Fig. H)

LOCATION: Lat. 49°53.6–56.6′ Long. 119°57.9′ to 120°01.7′ (82E/13W, 92H/16E)
See report on this property, page 391.

SIMILKAMEEN MINING DIVISION

TULAMEEN RIVER

SILVER HILL (No. 35, Fig. H)

LOCATION: Lat. 49°25′ Long. 121°04′ (92H/6E)
Between 4,500 and 5,000 feet elevation, 21 miles southwest of Tulameen, on Treasure Mountain and Sutter Creek.

CLAIMS: Fifty.

ACCESS: By road from Tulameen, 21 miles.

OPERATOR: COPPER RANGE EXPLORATION COMPANY, INC., 755, 1199 West Pender Street, Vancouver 1.

METALS: Silver, lead, zinc.

WORK DONE: Underground geological mapping, 1 inch equals 200 feet; magnetometer survey, 10 line-miles; geochemical soil, rock, and stream sediment survey, 200 samples; road construction, 1.5 miles on Treasure Mountain; trenching, 1,000 feet; underground work, Nos. 1, 2, and 3 levels reopened, sampled, and mapped.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1956, p. 71.

IRA, IR (No. 34, Fig. H)

LOCATION: Lat. 49°32.7–41.3′ Long. 120°53–56.8′ (92H/10W)
Chiefly along Skwum Creek, between the Independence and Laws camps, 8 miles northwest of Tulameen.

CLAIMS: Approximately 150, including IRA, IR, SC, SK, RA, WI, ML.

ACCESS: By road from Tulameen, 18 miles.

OPERATOR: COPPER RANGE EXPLORATION COMPANY, INC., 755, 1199 West Pender Street, Vancouver 1.

METALS: Copper, molybdenum.

DESCRIPTION: Porphyry dykes mineralized with chalcopyrite and molybdenite intrude Nicola Group sediments and volcano-sediments.

WORK DONE: Claims, topography, and surface workings mapped; surface geological mapping, 1 inch equals 500 feet on all claims; airborne magnetometer survey, 60 line-miles covering all claims; geochemical soil survey; road construction, 5 miles on east side of Skwum Creek; trenching, 1,000 feet; surface diamond drilling, one hole totalling 1,000 feet on SC 34; percussion drilling, 19 holes totalling 4,000 feet.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 281; Assessment Report 2434.

CO (No. 125, Fig. H)

LOCATION: Lat. 49°37′ Long. 120°53′ (92H/10W)
On both sides of Lawless Creek, about 7 miles northwest of Tulameen.

CLAIMS: CO 1 to 22.

ACCESS: By road from Tulameen.

OWNER: J. H. MONTGOMERY.

WORK DONE: Ground magnetometer and biogeochemical surveys.

REFERENCE: Assessment Report 2763.

FRM (No. 38, Fig. H)

LOCATION: Lat. 49°30′ Long. 120°52.7′ (92H/7W, 10W)
At headwaters of Olivine Creek, 6 miles southwest of Tulameen.

CLAIMS: FRM.

OPERATOR: FORT RELIANCE MINERALS LIMITED, 302, 550 Burrard Street, Vancouver 1.

WORK DONE: Geological and ground magnetometer surveys.

REFERENCE: Assessment Report 2742.

IRON (No. 38, Fig. H)

LOCATION: Lat. 49°29.4′ Long. 120°48.9′ (92H/7W)
On Tanglewood Hill, north of Lodestone Mountain, 4 miles west of Blakeburn.

CLAIMS: IRON 1 to 8, 17 to 24.

ACCESS: By road from Blakeburn.

OWNER: IMPERIAL METALS AND POWER LTD., 1512, 1177 West Hastings Street, Vancouver 1.

METAL: Iron.

DESCRIPTION: Magnetite disseminated in ultrabasic rocks.

WORK DONE: Ground magnetometer survey.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 282 (*see* HG, IRON, DB, EV); Assessment Report 2539.

ASP (No. 38, Fig. H)

LOCATION: Lat. 49°30′ Long. 120°51′ (92H/7W, 10W)
On Olivine Creek, 5 miles southwest of Tulameen.

CLAIMS: ASP 1 to 19.

ACCESS: By road from Coalmont, 15 miles.

Operator: SICINTINE MINES LIMITED, 401, 550 Burrard Street, Vancouver 1.
Metal: Copper.
Description: Bornite and chalcopyrite occur in lensy disseminated zones in olivine gabbro.
Work done: Geochemical soil survey, 450 samples.
Reference: Assessment Report 2526.

RC (No. 38, Fig. H)

Location: Lat. 49°28.4–29.6′ Long. 120°50.6–51.9′ (92H/7W)
At about 4,600 feet elevation, approximately 8 miles west of Coalmont, 1½ miles north of Lodestone Lake.
Claims: RC 1 to 10, 17 to 26.
Access: By gravel road from Coalmont, 8 miles.
Owner: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.
Metal: Copper.
Description: Mineralization occurs in ultrabasic rocks consisting of periodotite, pyroxenite, and gabbro; minor amounts of pyrite, pyrrhotite, and magnetite are also present.
Work done: Percussion drilling, two holes totalling 600 feet on RC 10.
Reference: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 205.

POLARIS (No. 62, Fig. H)

Location: Lat. 49°22.3′ Long. 120°48′ (92H/7W)
At approximately 3,500 feet elevation, on Badger Creek, 10 miles south of Tulameen.
Claims: POLARIS, totalling 14.
Access: From Princeton by road.
Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.
Metal: Copper.
Description: Chalcopyrite in Nicola Group volcanics associated with structural lineaments that may be a complex fault zone associated with granodiorites to the west of the claim group.
Work done: Surface geological mapping, 1 inch equals 200 feet on Polaris 2 and 3.

WHIPSAW CREEK

MJ (No. 58, Fig. H)

Location: Lat. 49°17.2′ Long. 120°46.3′ (92H/7W)
Near head of Whipsaw Creek, 2 miles east of Skaist Peak, about 18 miles southwest of Princeton.
Claims: MJ 1 to 14, 16 to 21, 23; HONDA 1 to 4; LMR 1, 2.
Access: By road about 12 miles up Whipsaw Creek from Highway 3.
Owner: MICHAEL E. JORGENSEN, 3091 West 35th Avenue, Vancouver 13.
Work done: Ground magnetometer survey.
References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 290; Assessment Report 2424.

MAE, KERRY (No. 136, Fig. H)

LOCATION: Lat. 49°16′ Long. 120°43′ (92H/7E)
Astride Whipsaw Creek, between elevations of 4,700 and 6,000 feet, approximately 12 miles by road southwest of Highway 3 up Whipsaw Creek.
CLAIMS: MAE, KERRY, PAT, MIKE.
ACCESS: By road from Highway 3 at Whipsaw Creek bridge, 12 miles.
OWNER: WHIPSAW MINES LTD, 707, 509 Richards Street, Vancouver 2.
METALS: Copper, lead, zinc, silver.
DESCRIPTION: Mineralized breccia zones and veins in Nicola volcanic and associated rocks.
WORK DONE: Geological and geochemical surveys.
REFERENCE: Assessment Report 2802.

TRIP (No. 42, Fig. H)

LOCATION: Lat. 49°20.1′ Long. 120°38.8′ (92H/7E)
Between 4,000 and 4,500 feet elevation adjoining Whipsaw Creek, on north, along a tributary 3½ miles southwest of Highway 3.
CLAIMS: TRIP 1 to 12.
ACCESS: By gravel road from Highway 3, 6 miles.
OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.
METAL: Copper.
WORK DONE: Percussion drilling, three holes totalling 840 feet.

ANV (No. 64, Fig. H)

LOCATION: Lat. 49°22′ Long. 120°37′ (92H/7E)
Between Corral and Lamont Creeks, on north side of Whipsaw Creek, 1¾ miles west of the highway bridge over Whipsaw Creek.
CLAIMS: ANV 1 to 6, 25, 27, 29.
ACCESS: By road from Highway 3.
OWNER: J. S. CHRISTIE, 827 Claybrook Road, Richmond.
WORK DONE: Ground magnetometer survey.
REFERENCE: Assessment Report 2599.

AXE, SKI (No. 137, Fig. H)

LOCATION: Lat. 49°20′ Long. 120°35′ (92H/7E)
Between Highway 3 and Whipsaw Creek, 2 to 4 miles southwest of the mouth of Whipsaw Creek.
CLAIMS: AXE 1 to 16, SKI 1 to 4.
ACCESS: From Princeton, 13 miles south on Highway 3, thence north on the Kennedy Lake road.
OPERATOR: NEWMONT MINING CORPORATION OF CANADA LIMITED, 1230, 355 Burrard Street, Vancouver 1.
METAL: Copper.
DESCRIPTION: Chalcopyrite with pyrrhotite disseminated or in fractures in metasiltstone.
WORK DONE: Geological and soil geochemical surveys.
REFERENCES: Assessment Reports 2826, 2827.

SIMILKAMEEN RIVER

SIMILKAMEEN MINE (INGERBELLE) (No. 6, Fig. H)

By David Smith

LOCATION: Lat. 49°20.2′ Long. 120°33.3′ (92H/7E)
On Highway 3, 13 miles south of Princeton.

CLAIMS: INGERSOLL BELLE, INVINCIBLE, LELA, RED BUCK, etc., totalling 66.

ACCESS: By Highway 3 from Princeton, 13 miles.

OWNER: SIMILKAMEEN MINING COMPANY LIMITED, Box 520, Princeton. (Name officially changed from Ingerbelle Mines Limited to Similkameen Mining Company Limited in 1970.)

METAL: Copper.

DESCRIPTION: Chalcopyrite filling fractures and disseminated in volcanic rocks.

WORK DONE:

Road construction, 10 miles on property, including relocation of part of Highway 3; underground diamond drilling, 6,500 feet in 12 holes on the Ingersoll Belle.

On December 16, using new equipment, four 100-ton Lectra Hauls and a 10-yard shovel assembled on the job-site, a start was made on removal of overburden from the pit area.

Construction of the heavy-duty equipment shop and power house was completed; mill construction moved ahead rapidly because of good weather conditions; foundations for the concentrator were well advanced with some steel erection completed; and the main office and dry buildings were nearly finished. A construction camp to hold 300 men was established at the millsite.

Four 500-kw. and one 250-kw. diesel-driven generators were installed for temporary power during construction. The pit distribution overhead line was built and a P & H shovel of 600 horsepower and a B & E 60-R drill of 300 horsepower were put into service.

At the year-end 200 men were employed on the construction of the mill and 100 men were employed by the company.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 283.

COPPER MOUNTAIN MINE (No. 130, Fig. H)

LOCATION: Lat. 49°20′ Long. 121°31.2′ (92H/8W)
At 3,000 feet elevation on Copper Mountain, about 12 miles south of Princeton.

CLAIMS: Mineral Lease M-49.

ACCESS: From Princeton by road, 12 miles.

OWNER: CUMONT MINES LIMITED, 915, 25 Adelaide Street East, Toronto, Ont.

METALS: Copper, gold.

DESCRIPTION: *See Geology, Exploration, and Mining in British Columbia*, 1969, pages 283 to 287.

WORK DONE: Surface geological mapping; ground magnetometer survey, 1 line-mile; four trenches totalling 1,950 feet.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 283–287; Assessment Report 2792.

EVA, ASH, OAK (No. 36, Fig. H)

LOCATION: Lat. 49°17.6–19.3′ Long. 120°33.6–35.5′ (92H/7E)
At approximately 4,000 feet elevation, 15 miles south of Princeton, straddling the Hope–Princeton highway between Deep Gulch and Friday Creeks.

CLAIMS: EVA, ASH, OAK, ELM, 28 in all.

ACCESS: By Highway 3.

OWNER: COPPER MOUNTAIN CONSOLIDATED LIMITED, 2627 Ottawa Avenue, West Vancouver.

METAL: Copper.

WORK DONE: Induced polarization survey, 9 line-miles and electromagnetic survey, 4 line-miles on Eva 3 and 6; surface diamond drilling, one hole totalling 638 feet on Eva 6; 2 miles of camp road constructed.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 178.

ILK, ELK, FRI, PR (No. 149, Fig. H)

LOCATION: Lat. 49°16.4–20.7′ Long. 120°30–35′ (92H/7E)
Between 3,000 and 4,500 feet elevation, 12 miles south of Princeton, just south of Copper Mountain, east side of Similkameen River.

CLAIMS: ILK, ELK, FRI, PR, NI, U & I, MARQUIS OF LORNE, Mineral Leases M-48, M-51, M-56, M-68, M-70, totalling 111 claims.

ACCESS: By road from Princeton, 19 miles.

OWNER: Kalco Valley Mines Ltd.

OPERATOR: NEWMONT MINING CORPORATION OF CANADA LIMITED, 1230, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: The property covers the south contact of Copper Mountain stock (syenite, monzonite, diorite). Chalcopyrite and bornite occur within the stock near its contact, and chalcopyrite, pyrite, and pyrrhotite are found within the Nicola volcanics.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 17.5 line-miles; and magnetometer survey, 21.5 line-miles covering Mineral Leases M-48, M-51, and M-56 and U & I and Marquis of Lorne claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 288.

SOB, ILSE (No. 59, Fig. H)

LOCATION: Lat. 49°16′ Long. 120°28′ (92H/8W)
Three to 4 miles east of Similkameen River, due west of the mouth of Sunday Creek and about 13 miles south of Princeton.

CLAIMS: SOB 1 to 8, ILSE 5 to 12.

OWNER: AURUS MINING LTD., 230, One Bentall Centre, Vancouver 1.

WORK DONE: Geochemical soil survey.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 289; Assessment Report 2558.

RED STAR, SPENHO (No. 138, Fig. H)

LOCATION: Lat. 49°08.8′ Long. 120°36.5′ (92H/2E)
Between 3,700 and 5,000 feet elevation, straddling Highway 3 between Pasayten River and Bonnevier Creek, 30 miles west of Princeton.

CLAIMS: One hundred and fifteen, including SPENHO, BEE, DIANE, ENID, etc.

ACCESS: By Hope–Princeton highway.

OWNER: Spenho Mines Ltd.

OPERATOR: IRONSIDES EXPLORATION CORPORATION LTD., 621, 470 Granville Street, Vancouver 2.

METALS: Copper, gold, silver, zinc.

DESCRIPTION: Scattered pods of sulphides in schists and volcanics.

WORK DONE: Electromagnetic and soil and stream sediment geochemical surveys.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 290; Assessment Report 2807.

PASAYTEN RIVER

HEL (No. 134, Fig. H)

LOCATION: Lat. 49°00.4′ Long. 120°28.4′ (92H/1W)
Between 4,500 and 5,000 feet elevation, approximately 3 miles east of Pasayten River.

CLAIMS: HEL 1 to 24.

ACCESS: From Similkameen Falls by gravel road, 16 miles.

OWNER: BETHLEHEM COPPER CORPORATION LTD., 2100, 1055 West Hastings Street, Vancouver 1.

DESCRIPTION: Coast Range granodiorite, with much pyrite and minor sericite alteration.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet on all claims; percussion drilling, two holes totalling 255 feet.

SMITH CREEK

ILE (No. 81, Fig. H)

LOCATION: Lat. 49°22′ Long. 120°14′ (92H/8E)
At approximately 4,200 feet elevation, 1½ to 2½ miles up Smith Creek, 15 miles southeast of Princeton.

CLAIMS: ILE 1 to 10.

ACCESS: By forest access road from Highway 3, 3.2 miles.

OWNER: D. SCOTT, 102, 1765 Duchess Avenue, West Vancouver.

METALS: Silver (copper).

DESCRIPTION: Property straddles Nicola volcanics-Coast Intrusive contact. Anomalously high silver values in rock geochemistry.

WORK DONE: Reconnaissance surface geological mapping, 1 inch equals 1,000 feet; ground magnetometer survey, 10 line-miles covering ILE 1 to 8; electromagnetic survey, 2 line-miles covering ILE 1 to 4; geochemical survey, 172 samples covering ILE 1 to 10.

RED CREEK

OWL, STAR, BOB (No. 56, Fig. H)

LOCATION: Lat. 49°28–31.4′ Long. 120°15–17.7′ (92H/8W, 9W)
Between Stevens and Red Creeks, 11 miles east of Princeton.

CLAIMS: OWL 1 to 30, STAR 1 to 26, BOB 1 to 10.

ACCESS: Logging-road.

OWNER: ADCO SILVER MINES LTD., 534, 789 West Pender Street, Vancouver 1.

METALS: Lead, zinc, copper.

WORK DONE: Ground magnetometer survey.

REFERENCE: Assessment Report 2328.

PRINCETON

GE (No. 133, Fig. H)

Location: Lat. 49°29.1′ Long. 120°28.1′ (92H/8W, 9W)
At approximately 3,200 feet elevation, between Allison and Hayes Creeks, 2 to 5 miles northeast of Princeton.

Claims: GE, DOT, ML, etc., totalling 343.

Access: From Princeton by old Five Mile road, 2½ miles.

Owner: JOY MINING LIMITED, 390 West Hastings Street, Vancouver 3.

Metal: Copper.

Work done: Trenching, 500 feet on ML 38 and Dot 1 and 3; stripping, one-quarter square mile on GE 3, 4, and 46.

TUL (No. 129, Fig. H)

Location: Lat. 49°27–30′ Long. 120°31′ (92H/7E)
On hillside adjoining Princeton, to the northwest.

Claims: TUL, totalling 111.

Access: From Princeton by road, 1 mile.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metal: Copper.

Work done: Induced polarization survey, 10 line-miles covering TUL 50, 51, 95, 97, 99, 101, 103, 123 to 130, 144 to 146; surface diamond drilling, three EX holes totalling 185 feet on TUL 129 and 130.

SUMMERS CREEK

DOT (No. 61, Fig. H)

Location: Lat. 49°34.3′ Long. 120°31′ (92H/10E)
On hillside west of Summers Creek, 3 miles north of the Allison Creek junction and 7 miles north of Princeton.

Claims: DOT 51 to 93, ELEPHANT 1 to 4.

Access: From Princeton by road, 7 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metal: Copper.

Description: Moderately altered Nicola rocks.

Work done: Surface geological mapping, 1 inch equals 200 feet on Dot 51 to 57, 59 to 69, 71, 77 to 88; induced polarization and magnetometer survey, 25 line-miles covering same claims.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 280; Assessment Report 2518.

SHR, JOY (No. 116, Fig. H)

Location: Lat. 49°35.8′ Long. 120°28.5′ (92H/6W)
Along Christian Creek, 4 miles north of Jura.

Claims: SHR, JOY.

Access: By road from Jura.

Operator: CANWEX EXPLORATIONS LTD., 1666 West Broadway, Vancouver 9.

Work done: Induced polarization survey.

Reference: Assessment Report 2758.

PIP, OK (No. 22, Fig. H)

LOCATION: Lat. 49°37.2–38.9′ Long. 120°28.4–31.6′ (92H/9W, 10E)
Between Summers and Ramparts Creeks, 12 miles north of Princeton.

CLAIMS: PIP 1 to 16, PIP 1 and 2 Fractions, OK 19 to 32, 37 to 48.

ACCESS: By road from Princeton, 12 miles.

OPERATOR: KALCO VALLEY MINES LTD., 1710, 1177 West Hastings Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Widespread low-grade copper mineralization.

WORK DONE: Percussion drilling, five holes totalling 500 feet on the Pip claims.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 204 (*see* Pip, Cop).

AXE, BUD, BOL (No. 21, Fig. H)

LOCATION: Lat. 49°38–41.3′ Long. 120°30–33′ (92H/10E)
At 4,500 feet elevation astride and west of Summers Creek, 14 miles due north of Princeton.

CLAIMS: AXE 1 to 60, 65 to 70, 75 to 86; Fractions 1A to 5A; BUD 1 to 11; BOL 1 to 3, 20 to 27.

ACCESS: By road from Princeton, 14 miles.

OPERATOR: AMAX EXPLORATION, INC., 601, 535 Thurlow Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Chalcopyrite, molybdenite, and pyrite disseminated in Nicola volcanics, with quartz-potash feldspar-epidote-chlorite-magnetite alteration.

WORK DONE: Geophysical work, 4 line-miles; geochemical work, 1,000 soil samples; percussion drilling, 50 holes totalling 10,500 feet on the Axe claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 279.

ALLISON CREEK

ON (No. 60, Fig. H)

LOCATION: Lat. 49°38′ Long. 120°35′ (92H/10E)
Around and east of Laird Lake on Highway 5, 12 miles northwest of Princeton.

CLAIMS: ON 1 to 8, 21 to 28, 41 to 44, 49 to 60, 76 to 84.

ACCESS: Highway 5 and logging-roads.

OWNER: ZONE EXPLORATIONS LTD., 1010, 789 West Pender Street, Vancouver 1.

WORK DONE: Geochemical soil survey.

REFERENCE: Assessment Report 2542.

HAYES CREEK

AMANDA (No. 82, Fig. H)

LOCATION: Lat. 49°44–47.5′ Long. 120°18–20.8′ (92H/16W)
Between 4,000 and 5,000 feet elevation on Siwash Creek, 4 to 8 miles north of Bankier and 20 to 24 miles northeast of Princeton.

CLAIMS: AMANDA 1 to 24; AMIE 1, 2; PACO 1 to 20.

ACCESS: By logging-road from Bankier, 6 to 7 miles.

OWNER: DIANA EXPLORATIONS LTD., 6107 Buchanan Street, Burnaby 2.

METALS: Lead, zinc, silver, gold, copper.

DESCRIPTION: Sulphides in lenses and veins and some disseminations in diorite and altered granodiorite complex.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet on Amanda 1 to 24; magnetometer survey, 3 line-miles covering Amanda claims; geochemical soil survey, 150 samples covering Amanda 1 to 24.

REFERENCE: Assessment Report 2798.

BLUBEL (No. 66, Fig. H)

LOCATION: Lat. 49°40.9–42.8′ Long. 120°08.3–09.6′ (92H/9E) Between 3,500 and 5,500 feet elevation, adjoining Trout Creek to the south, 2 miles east of Osprey Lake.

CLAIMS: BLUBEL 1 to 32.

ACCESS: Road from Princeton.

OPERATOR: ARGEM EXPLORATIONS LTD., 1950 Lonsdale Avenue, North Vancouver.

METAL: Molybdenum.

WORK DONE: Airborne electromagnetic survey.

REFERENCE: Assessment Report 2625.

EMPRESS (No. 128, Fig. H)

LOCATION: Lat. 49°38.2–40.9′ Long. 120°03.5–13.3′ (92H/9E) At approximately 4,300 feet elevation at eastern headwaters of Empress Creek, 3 miles south of Mazama.

CLAIMS: EMPRESS, totalling 153.

ACCESS: From Princeton by road, 33 miles.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METAL: Molybdenum.

DESCRIPTION: Molybdenite associated with pyrite in fractures and disseminated in granodiorite and quartz monzonite; slight to moderate sericitic and kaolinitic alteration.

WORK DONE: Seismic survey, 100 stations covering Empress 3 to 10 and 259 to 272; surface diamond drilling, 3,280 feet on Empress 3, 4, 6, and 7.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 281.

OSOYOOS MINING DIVISION

BRENDA LAKE

TIC, TOC (No. 100, Fig. H)

LOCATION: Lat. 49°52.9–59.7′ Long. 119°52.3–58.3′ (82E/13W) Between 5,000 and 6,000 feet elevation, extending northeast from Brenda mine to Cameo Lake.

CLAIMS: TIC, TOC, totalling 312.

ACCESS: From Peachland by road, 10 to 35 miles.

OWNER: ARROW INTER-AMERICA CORPORATION, 304, 535 Thurlow Street, Vancouver 5.

METALS: Copper, molybdenum.

DESCRIPTION: Geology similar to that of the Brenda mine area.

Work done: Surface geological mapping, 1 inch equals one-quarter mile; aeromagnetic survey, 42 line-miles covering all claims; geochemical soil survey, 500 samples.

Reference: Assessment Report 2701.

TEE, LITE, BERN (No. 88, Fig. H)

Location: Lat. 49°53.6–56.6′ Long. 119°57.9′ to 120°01.7′ (82E/13W, 92H/16E)

At approximately 5,500 feet elevation, near the head of Trepanier Creek, 15 miles northwest of Peachland.

Claims: TEE 1 to 16; LITE 1 to 8; BERN 9, 10, 21, 22, 33, 34; JEF 1 to 48; GUN 1 to 6; ANN 7 to 22; BOB 17 to 28; MOB 1 to 8; COLEE 4, 6, 11, 13.

Access: By road from Peachland, 30 miles.

Owner: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.

Metals: Copper, molybdenum.

Description: Chalcopyrite, molybdenite, and pyrite in fractured granodiorite, with some biotite and propylitic alteration.

Work done: Surface geological map, 1 inch equals 400 feet on Bob, Mob, Tee, Jef, and Ann.

BRENDA MINE (No. 150, Fig. H)

By David Smith

Location: Lat. 49°52.8′ Long. 120°00.5′ (92H/16E)

One and one-half miles southeast of Brenda Lake.

Claims: Mineral Leases M-58, M-59, M-77, M-78, M-79, M-82, M-83, plus 238 mineral claims and fractions. The open pit will lie primarily within Mineral Lease M-58.

Access: Access to the property is provided by 4 miles of paved road and 14 miles of gravel road from Peachland.

Owner: BRENDA MINES LTD., Box 420, Peachland.

Metals: Copper, molybdenum (*see* Table 1 for production).

Work done:

In 1970, tune-up of the mill continued throughout the first quarter, with full rated capacity of 24,000 tons per day being achieved and maintained throughout the year.

Shipping of the copper concentrates began in late January. Shipping of molybdenum concentrate commenced in March. Copper concentrates are trucked to Kelowna and transferred to railway cars.

During 1970, 13,173,000 tons of material was removed from the pit, consisting of 7,512,000 tons of mill feed; 1,948,000 tons of low-grade stockpile; 3,502,000 tons of waste; and 211,000 tons of overburden.

Equipment consists of twelve 100-ton Lectra Haul trucks, three 11-cubic-yard electric shovels, and two 60-R drills.

In the pit area a fuel unloading bay, a truck parking-lot, and truck scales building were constructed. In the plant area a warehouse, lunchroom, and workshop were built. Electric lighting, heating, and ventilating fans were installed in these buildings. Other equipment installed consisted of a boiler, fire alarm system, and electric welders.

Brenda Mines Ltd., in 1970, had a payroll of 398, comprising: Staff, 90; pit, 73; mill, 75; surface maintenance, 160.

References: *Minister of Mines, B.C.,* Ann. Repts., 1967, pp. 183–211; 1968, p. 215; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 292.

PEACHLAND

SID, KC (No. 203, Fig. H)

LOCATION: Lat. 49°46–46.7′ Long. 119°50′ (82E/13W)
At approximately 2,500 feet elevation, 3½ miles west of Peachland, Brenda area.

CLAIMS: SID 2, 5, 7 to 14; KC 14 to 20.

ACCESS: By road from Peachland, 3½ miles.

OWNER: INDEX MINES LTD., 543 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Granodiorite intrusive mass is sheared and cut by quartz vein systems. Bornite and native copper and molybdenite found in blebs in drill cores. Shear zone heavily iron-stained.

WORK DONE: Surface diamond drilling, three holes totalling 270 feet on Sid 2 claim.

SID, KC (No. 203, Fig. H)

LOCATION: Lat. 49°44.8–46′ Long. 119°50′ (82E/12W, 13W)
At approximately 2,500 feet elevation, 3½ miles west of Peachland.

CLAIMS: SID 1, 3, 4, 6; KC 1 to 13.

ACCESS: By road from Peachland, 3½ miles.

OWNER: BRENDAKO MINES LTD., 543 Granville Street, Vancouver 2.

METALS: Copper, molybdenum.

DESCRIPTION: Granodiorite intrusive mass is sheared and cut by quartz vein systems. Bornite and native copper and molybdenite found in blebs in drill cores. Shear zone heavily iron-stained.

WORK DONE: Surface diamond drilling, two holes totalling 180 feet on Sid 3 claim.

SUMMERLAND

SUN, SIG, DAN (No. 154, Fig. H)

LOCATION: Lat. 49°37.4′ Long. 119°52′ (82E/12W)
On the north side of Trout Creek, 8 miles west-northwest of Summerland, on the old Summerland–Princeton road.

CLAIMS: SUN, SIG, DAN, APIA, UPOLU, OCTO, SIEBEN, totalling 61.

ACCESS: From Summerland by road, 12 miles.

OWNER: AUSTRO-CAN EXPLORATIONS LTD., 1250, 505 Burrard Street, Vancouver 1.

METALS: Copper, silver, gold.

WORK DONE: Surface geological mapping on the Sun claims; magnetometer survey, 30 line-miles; geochemical survey, 175 samples; stripping on Sun claims; surface diamond drilling, three holes totalling 1,080 feet on Sun claims.

REFERENCE: Assessment Report 2198.

HEDLEY

HED (No. 117, Fig. H)

LOCATION: Lat. 49°29.3–31.3′ Long. 120°00.3–02.6′ (92H/8E, 9E)
At headwaters of Hedley Creek, 12 miles north-northeast of Hedley.

CLAIMS: HED, totalling 28.

ACCESS: By helicopter or by road from Summerland, 22 miles.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metal: Copper.

Work done: Surface geological mapping, 1 inch equals 400 feet; geochemical soil, stream sediment, and rock sample survey.

Reference: Assessment Report 2709.

JM (No. 43, Fig. H)

Location: Lat. 49°28′ Long. 120°08′ (92H/8E)
At approximately 5,000 feet elevation, 8 miles north-northwest of Hedley.

Claims: JM, totalling 28.

Access: From Princeton by road.

Owner: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

Metal: Molybdenum.

Description: Molybdenite occurs in fractures associated with pyrite in andesite underlain by granodiorite.

Work done: Surface geological mapping; geochemical survey, 270 reconnaissance samples covering JM 2, 4 to 7, 74, 75, and 77; surface diamond drilling, four EX holes totalling 443 feet on JM 4 and 6.

NICKEL PLATE (No. 93, Fig. H)

Location: Lat. 49°22′ Long. 120°03′ (92H/8E)
Between 4,000 and 6,000 feet elevation, 3 miles east of Hedley.

Claims: Eighty-three Crown grants of the Nickel Plate and South Rim groups.

Access: By road from Hedley, 9 miles.

Operator: G.M. EXPLORATIONS LIMITED, 1131 Melville Street, Vancouver 5.

Metals: Gold, copper, silver.

Description: Contact metamorphic deposits in skarnified limestones; gold closely associated with arsenopyrite; pyrrhotite and chalcopyrite also present.

Work done: Surface geological mapping, 1 inch equals 100 feet on Warhorse, Rollo, Princeton, Copperfield, and Nickel Plate; underground geological mapping, 1 inch equals 30 feet on 15 level, Morning and Copper Cleft; electromagnetic surveys, 4.5 line-miles covering Kingston, Warhorse, Rollo and Princeton, 5.5 line-miles covering Copper Cleft, Climax, Mound, IXL, Bulldog, and 1.5 line-miles covering Copperfield and Nickel Plate; geochemical soil survey, 428 samples covering Copper Cleft, Climax, Mound, IXL, Bulldog, Copperfield, and Nickel Plate; surface diamond drilling, five holes totalling 1,605 feet on Kingston, Warhorse, and Rollo; underground diamond drilling, five holes totalling 1,448.5 feet on Morning.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 219.

NEWT (No. 153, Fig. H)

Location: Lat. 49°19.5′ Long. 120°07.5′ (92H/8E)
Three miles southwest of Hedley townsite, adjoining Indian Reserve 2C to the northeast.

Claims: NEWT, FLINT, STONE, HANH, ROCK, totalling 31.

Access: By road from Hedley.

Owner: AUSTRO-CAN EXPLORATIONS LTD., 1250, 505 Burrard Street, Vancouver 1.

Metals: Silver, gold, zinc, lead.

Work done: Surface geological mapping; geochemical survey, 53 samples; road construction, 3 miles.

DON (No. 4, Fig. H)

Location: Lat. 49°16.4′ Long. 120°07.1′ (92H/8E)
At approximately 5,000 feet elevation, 6 miles southwest of Hedley.

Claims: DON, 28 claims.

Access: By road from Keremeos.

Owner: CONOCO SILVER MINES LTD., Suite 3, 4647 Kingsway, Burnaby 1.

Metals: Silver, gold.

Work done: Magnetometer survey of Don claims; approximately 2½ miles of jeep road.

ASHNOLA RIVER

ASH, NOLA, JAM (No. 8, Fig. H)

Location: Lat. 49°07′ Long. 120°20′ (92H/1W)
At 4,100 to 6,100 feet elevation, 23 air-miles southeast of Princeton, west of Keremeos.

Claims: ASH, NOLA, JAM, Q, CAR, MAX, McBRIDE Fraction, totalling 166.

Access: By jeep road from Keremeos, 30 miles.

Owner: PRISM RESOURCES LIMITED, 805, 850 West Hastings Street, Vancouver 1.

Metals: Copper, molybdenum.

Description: Disseminated pyrite, chalcopyrite, and molybdenite in rhyolite porphyry and quartz diorite. Host rhyolite severely leached in many places with quartz eyes remaining in fine-grained matrix.

Work done: Induced polarization survey, 35 line-miles; magnetometer survey, 35 line-miles; soil sampling, 1,730 samples, and biogeochemical sampling, 150 samples on the Ash, Nola, Jam, and Car claims; rock sampling, 50 samples; road construction, 1 mile on the Nola 1, 3, 4, and 41 claims; surface trenching, 4,000 feet on the Nola 2, 4, 7, 8, 25, 27, 41, and 43 claims.

References: *Minister of Mines, B.C.,* Ann. Repts., 1966, p. 187; 1968, p. 219, Assessment Reports 2545, 2721.

KEREMEOS

HORN SILVER MINE (No. 146, Fig. H)

By David Smith

Location: Lat. 49°03.4′ Long. 119°41.3′ (82E/4E)
Sixteen miles south of Keremeos.

Claims: Two Crown-granted and 142 recorded mineral claims.

Access: Access to the mine plant at 2,622 feet elevation is by a 2½-mile road which leaves the Keremeos–Richter Pass highway at the foot of Richter Mountain.

Owner: UTICA MINES LTD., 904, 510 West Hastings Street, Vancouver 2; mine address, Box 47, Keremeos.

Metals: Silver, gold (*see* Table 1 for production).

Work done:

Mining is carried out on three levels, at elevations 2,622, 2,570, and 2,422 feet. Ore is broken in sublevel stopes, scraped to loading chutes, transferred to the ore pass on the 2400 main haulage level, using 1-ton cars and battery locomotives. The ore is then trammed to surface and trucked on surface to the mill.

No housing is provided, and employees commute from Osoyoos, a distance of 10 miles, and from Keremeos, a distance of 14 miles.

The exploration adit of 2210 level was driven 1,800 feet and two exploration raises totalling 320 feet were driven in search of more ore. Development in the mine was continued to cessation of operations in March 1970, when mine and mill were completely shut down and a watchman left on the property.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1965, pp. 162, 163; 1966, p. 190; 1967, pp. 219–221; 1968, p. 221; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 297.

SUSAP, SUP, BUCK (No. 152, Fig. H)

LOCATION: Lat. 49°06.5′ Long. 119°48.6′ (82E/4W)
At approximately 4,000 feet elevation, 7 miles due south of Keremeos, between Susap and Hunter Creeks.

CLAIMS: SUSAP 2 Fraction, SUSAP 5, SUP 3 to 6, BUCK 11 to 26.

ACCESS: From Highway 3 by road, 10 miles.

OWNER: CRO-MUR MINING AND EXPLORATION CO. LTD., 414 Ellis Street, Penticton.

METALS: Copper, molybdenum.

DESCRIPTION: Molybdenite and chalcopyrite occur as fracture-fillings most commonly with quartz in quartz monzonite.

WORK DONE: Road construction, 1 mile (to Coulthard Creek from end of logging-road); trenching, 300 feet on Susap group.

GORD, KEN, MARK (No. 3, Fig. H)

LOCATION: Lat. 49°12.8′ Long. 119°41.1′ (82E/4E)
At approximately 3,500 feet elevation, 3½ miles northeast of Cawston.

CLAIMS: GORD 1 to 5, KEN 1 to 14, MARK 1 to 14.

ACCESS: By road from Keremeos.

OWNER: CONOCO SILVER MINES LTD., Suite 3, 4647 Kingsway, Burnaby 1.

METALS: Silver, gold, copper.

WORK DONE: Stripping, 40,000 square feet.

GOLCONDA (No. 147, Fig. H)

By David Smith

LOCATION: Lat. 49°15.7′ Long. 119°50.5′ (82E/5W)
Adjacent to Olalla, on the west and south of Olalla Creek.

CLAIMS: COPPER KING, VOIGHT, NORTH STAR, TRONT, ALMA 1 to 7.

ACCESS: By gravel road, 1½ miles from Olalla.

OWNER: TRENT RESOURCES LTD., 227, 470 Granville Street, Vancouver 2.

METALS: Copper, molybdenum (*see* Table 1 for production).

DESCRIPTION: Pyrite, chalcopyrite, molybdenite, and minor galena in veins in pyroxenite.

WORK DONE: In 1970, construction of a 100-tons-per-day mill was started on a site 200 feet below the present mill. The crushing plant consisted of a jaw crusher and a cone crusher driven by a 30- and a 40-horsepower motor respectively. The concentrator equipment consisted of two mills driven by two 150-horsepower motors; two banks of flotation cells driven by twelve 3-horsepower and two 5-horsepower motors; a vacuum pump driven by a 50-horsepower motor; a filter pump; and several conveyors. Power was supplied by a 500-kva. 480-volt three-phase diesel-driven generator. Because of difficulties experienced in the recovery and lack of mill feed, the operation subsequently shut down. Underground a short drive was made exploring a new zone on the 2450 level. Some stoping and reclaiming of old workings was commenced on the 2655 level.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 221.

WHITE LAKE

THE GEOLOGY OF THE WHITE LAKE BASIN

By B. N. Church

Introduction

This report is intended as an outline of the geology of the White Lake basin preparatory to a more complete account to be published later as a bulletin. The stratigraphy, structural history, and petrology of the Tertiary volcanic succession are summarized and followed by a detailed description of the Dusty Mac gold-silver prospect near Okanagan Falls.

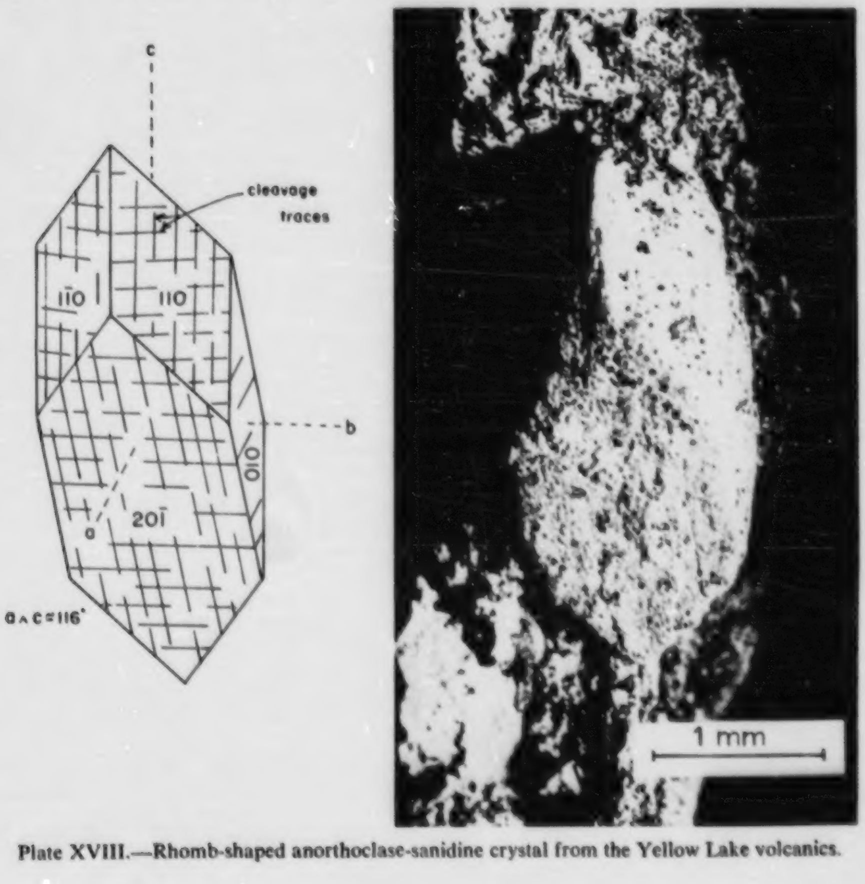


Plate XVIII.—Rhomb-shaped anorthoclase-sanidine crystal from the Yellow Lake volcanics.

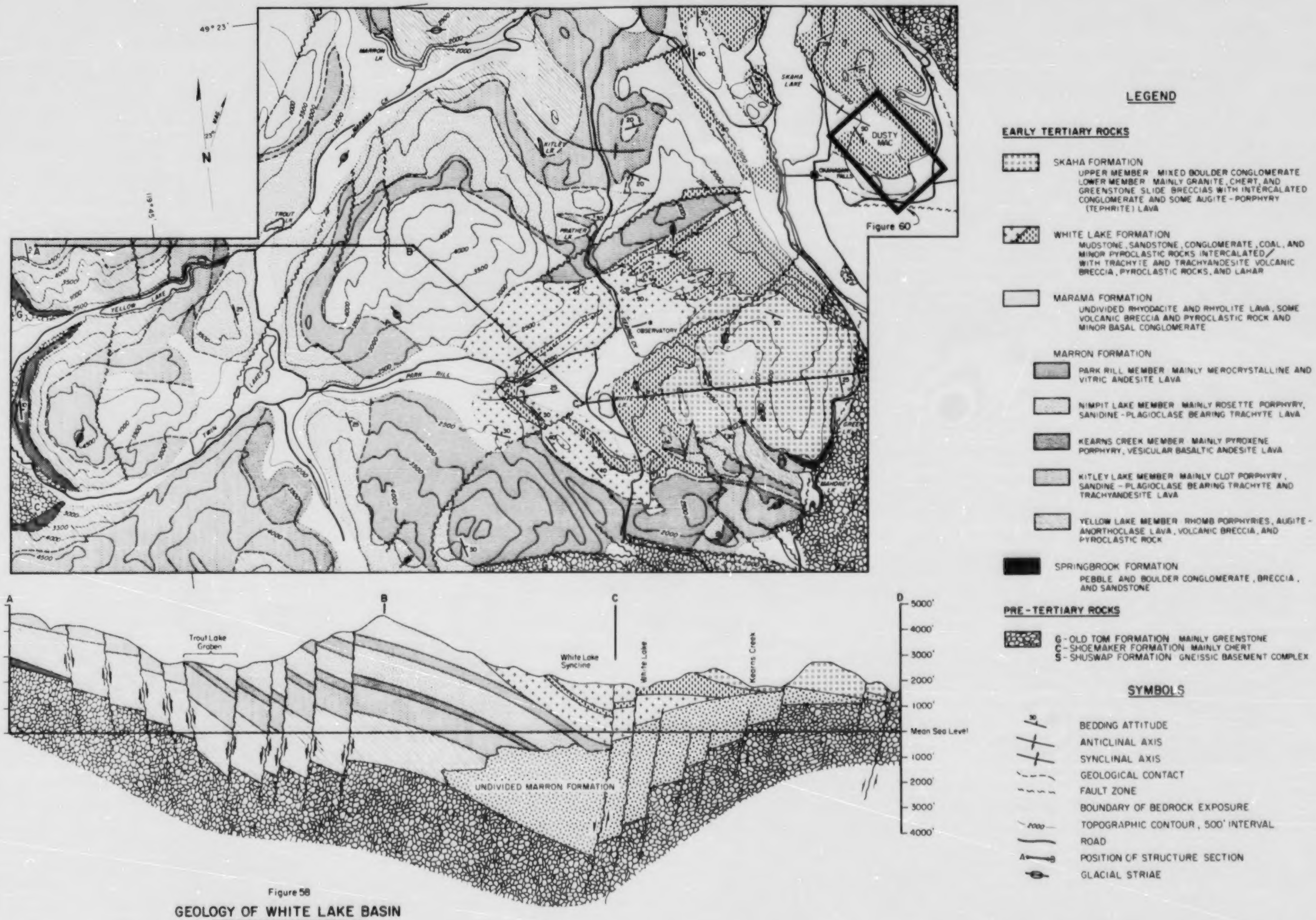

49° 23'
N
23° MAG.
119° 35'
MARRON LK
MARAMA CK
KITLEY LK
TROUT LK
PRATHER LK
SKAHA LAKE
DUSTY MAC
OKANAGAN FALLS
Figure 60
YELLOW LAKE
PARK RILL
TWIN
OBSERVATORY
A
B
C
D
G
S
Trout Lake Graben
White Lake Syncline
White Lake
Kearns Creek
UNDIVIDED MARRON FORMATION
5000'
4000'
3000'
2000'
1000'
Mean Sea Level
1000'
2000'
3000'
4000'
LEGEND
EARLY TERTIARY ROCKS
SKAHA FORMATION
UPPER MEMBER MIXED BOULDER CONGLOMERATE
LOWER MEMBER MAINLY GRANITE, CHERT, AND GREENSTONE SLIDE BRECCIAS WITH INTERCALATED CONGLOMERATE AND SOME AUGITE-PORPHYRY (TEPHRITE) LAVA
WHITE LAKE FORMATION
MUDSTONE, SANDSTONE, CONGLOMERATE, COAL, AND MINOR PYROCLASTIC ROCKS INTERCALATED/ WITH TRACHYTE AND TRACHYANDESITE VOLCANIC BRECCIA, PYROCLASTIC ROCKS, AND LAHAR
MARAMA FORMATION
UNDIVIDED RHYODACITE AND RHYOLITE LAVA, SOME VOLCANIC BRECCIA AND PYROCLASTIC ROCK AND MINOR BASAL CONGLOMERATE
MARRON FORMATION
PARK RILL MEMBER MAINLY MEROCRYSTALLINE AND VITRIC ANDESITE LAVA
NIMPIT LAKE MEMBER MAINLY ROSETTE PORPHYRY, SANIDINE-PLAGIOCLASE BEARING TRACHYTE LAVA
KEARNS CREEK MEMBER MAINLY PYROXENE PORPHYRY, VESICULAR BASALTIC ANDESITE LAVA
KITLEY LAKE MEMBER MAINLY CLOT PORPHYRY, SANDINE-PLAGIOCLASE BEARING TRACHYTE AND TRACHYANDESITE LAVA
YELLOW LAKE MEMBER RHOMB PORPHYRIES, AUGITE-ANORTHOCLASE LAVA, VOLCANIC BRECCIA, AND PYROCLASTIC ROCK
SPRINGBROOK FORMATION
PEBBLE AND BOULDER CONGLOMERATE, BRECCIA, AND SANDSTONE
PRE-TERTIARY ROCKS
G-OLD TOM FORMATION MAINLY GREENSTONE
C-SHOEMAKER FORMATION MAINLY CHERT
S-SHUSWAP FORMATION GNEISSIC BASEMENT COMPLEX
SYMBOLS
BEDDING ATTITUDE
ANTICLINAL AXIS
SYNCLINAL AXIS
GEOLOGICAL CONTACT
FAULT ZONE
BOUNDARY OF BEDROCK EXPOSURE
TOPOGRAPHIC CONTOUR, 500' INTERVAL
ROAD
POSITION OF STRUCTURE SECTION
GLACIAL STRIAE

Figure 58

GEOLOGY OF WHITE LAKE BASIN

GEOLOGY BY - N. CHURCH, 1970

0 1 2
SCALE - MILES

Physiography

The area is characterized by a low, mountainous terrain bounded on the east by the Okanagan and tributary valleys at base elevation of about 1,100 feet, and on the west by valleys of the Similkameen drainage system at about 1,800 feet. White Lake, a small ephemeral body of water, is located in the east central part of the area near the centre of a dish-shaped depression at 1,750 feet. Slopes rise gently from White Lake on the northwest and southwest to concordant summits which underlie a remnant of a once-continuous upland surface at about 4,500 feet, the Thompson Plateau. To the east the depression is separated from the Okanagan Valley by numerous small knobs and ridges and by Mount Hawthorne, which rises to an elevation of 2,750 feet. The basin rim is breached by several valleys containing small intermittent streams.

Low parts and south-facing slopes are open ranch land with plentiful bunchgrass, sagebrush, and cactus. Summits and north-facing slopes have forests of pine and fir of sufficient density to support a few logging operations.

General Geology and History

The erosionally dissected Tertiary rocks of the White Lake basin present an ideal cross-section of one of the many taphrobasins found throughout the Interior region of British Columbia. The strata consist of five main divisions showing a maximum aggregate thickness of about 12,000 feet (*see* the accompanying table).

Springbrook Formation—The Springbrook Formation is the lowest stratigraphic unit. These rocks are best exposed on bluffs in the extreme west part of the area. Discontinuous beds of pebble and boulder conglomerate and talus breccia dip gently to the east, displaying local thickness of as much as 700 feet. The coarse, clastic fragments are of diverse composition, being eroded from pre-Tertiary beds of feldspathic andesite, grey and black chert, argillite, chlorite schist, and gneiss.

Marron Formation—The Marron Formation is the thickest and most widely distributed stratigraphic division. Five volcanic events are recorded by the sequence and marked by deposition of distinctive mappable rocks. These rocks, which are mainly the product of fissure eruption, buried pre-existing valleys and hill tops to form thick sheet-like deposits.

The lowermost unit of the Marron Formation, the Yellow Lake member, is composed of biotite and pyroxene feldspathic phonolite and mafic phonolite lavas and pyroclastics. A distinctive feature of many feeder dykes and lava flows is that they contain what appears to be primary analcite and rhomb-shaped anorthoclase-sanidine composite phenocrysts (*see* Plate XVIII). At the time of extrusion the rocks completely covered the Springbrook Formation, filling old valleys in the Yellow Lake area with as much as 1,800 feet of lava and volcanic debris.

The Kitley Lake member represents the second important volcanic event in the Marron succession. These rocks are mainly clot-plagioclase porphyry trachyte and trachyandesite lavas. The lavas were deposited as a more or less uniform layer about 1,000 feet thick on a relatively smooth surface formed by the upper surface of the Yellow Lake volcanics. Potassium-argon analysis by Geochron Laboratories Inc. of biotite from a lava flow immediately east of Yellow Lake gives an age of 51.6±1.8 million years.

The Kearns Creek member is the middle unit in the Marron assemblage. These rocks are dark brown, highly vesicular basaltic andesite lavas and flow breccias. Normally the rocks have a dense charge of pyroxene phenocrysts with a few interspersed plagioclase laths. The rocks crop out at widely scattered points in the west and southeast parts of the area. The unit is relatively thin, attaining a maximum thickness, about 400 feet, west of Mahoney Lake.

The Nimpit Lake member is in the upper middle part of the Marron Formation. The unit consists of a series of trachyte and trachyandesite lava flows similar in chemical composition to the Kitley Lake lavas. Distinctively the rocks contain small rosette-shaped glomerophenocrysts of plagioclase and laths of sanidine. The rocks are well displayed east and southeast of Twin Lakes where the lava flows, totalling more than 1,000 feet thick, correspond to tiered benches on the slopes of the main hills.

The Park Rill member forms a good marker zone at the top of the Marron Formation. The unit consists of medium-brown merocrystalline and vitric andesite lava flows. These rocks were extruded on the relatively smooth surface of the Nimpit Lake member. In places the lavas form accumulations in excess of 1,500 feet thick.

The Marron rocks show important variations in attitude throughout the area. On the west the rocks are almost horizontal or dip gently east, in the north central part they arch over a broad southeast-trending anticlinal axis, and at the centre of the White Lake basin they are deeply buried by down-warped younger rocks.

Marama Formation—The Marama Formation was deposited during renewed volcanic activity after a period of deep erosion of Marron rocks. Viscous rhyolite and rhyodacite lavas flooded valleys, burying gravel deposits and overtopping local ridges. The Marama rocks are widely distributed in the northern part of the area where the unit is displayed in characteristic precipitous bluffs. The maximum observed thickness of the Marama Formation is about 1,000 feet on the ridge overlooking Marama Creek. Other thick sections are found southeast of Kitley Lake and Peach Cliff, immediately east of Okanagan Falls.

After a period of intense faulting and erosion of the Marama and older rocks, the main deposition occurred in the area near the Okanagan Valley, which by this time was a prominent topographic feature and an important link in the local drainage system.

White Lake Formation—The White Lake Formation is a composite sedimentary volcanic unit overlapping Marron and Marama rocks in the east part of the area. Deposition of the White Lake sedimentary phase coincided with the eruption of andesite and trachyandesite lavas from vents centred near the Okanagan Valley. It appears that a northerly flowing stream was dammed in this area by volcanic debris forming a lake several miles in diameter (Tertiary White Lake). Large volumes of laharic and pyroclastic material were periodically ejected from water-filled vents spilling debris into the Okanagan Valley and the nearby lake. Eventually the lake was filled with carbonaceous shale, sandstone, and tuffaceous sediments resulting in a total accumulation of 3,500 feet of strata.

The White Lake beds are folded and cut by many faults. At the centre of the basin the beds are folded into a broad syncline plunging about 25 degrees east. These rocks are more or less detached from White Lake strata near Skaha Lake by a fault zone along the west side of the Okanagan Valley.

It is noted that the beds in the White Lake syncline are generally more steeply dipping than older Tertiary strata in adjacent areas. These older rocks may have steep dips under White Lake beds, or, alternatively, the fold form changes with depth; shallow dips in Marron rocks may persist at depth in spite of steep inclination of the overlying White Lake beds if the beds are concentrically folded. White Lake beds are possibly accommodated in the core of a concentric fold by reverse faulting or thrust movement subparallel to bedding. Good evidence of reverse faulting is observed on the north limb of the syncline about 2½ miles northeast of

White Lake. At this point a slice of Marama rhyodacite is thrust upward through several hundred feet of White Lake beds.

Skaha Formation—The Skaha Formation is the youngest Tertiary unit. These rocks crop out in a small area located about one-half mile east of White Lake and about 2 miles southwest of Skaha Lake. The unit consists of two members, a lower one mainly composed of slide breccia and some volcanic rocks, and an upper one composed of coarse boulder fanglomerate. The gross nature of these clastic rocks reflects the dynamic condition under which they were deposited. The slide breccias were derived from high terrain underlain by an assemblage of chert, greenstone, and granite, and were deposited on older Tertiary and pre-Tertiary rocks, possibly at the base of a fault scarp. The slide breccias apparently disrupted local drainage and were partly eroded and reworked by stream action. The upper member, the fanglomerate beds, were derived partly from older Tertiary rocks and from the same high terrain that proved to be the source for the slide breccias. This material rests on eroded slide breccias and locally onlaps White Lake beds.

Petrology

Chemical analyses of the volcanic rocks of the White Lake basin show an extraordinary wide range in composition. Some appreciation of the differences is gained by examination of the accompanying variation diagram. It can be seen that the rocks are readily divisible into three magma series:

A series, an acid-line suite consisting of Marama rhyolite and rhyodacite (three analyses), Park Rill andesite (four analyses), White Lake andesite (one analysis), Kearns Creek basaltic andesite (one analysis).

B series, an alkaline suite consisting of Kitley Lake trachyte and trachyandesite (two analyses), Nimpit Lake trachyte and trachyandesite (two analyses).

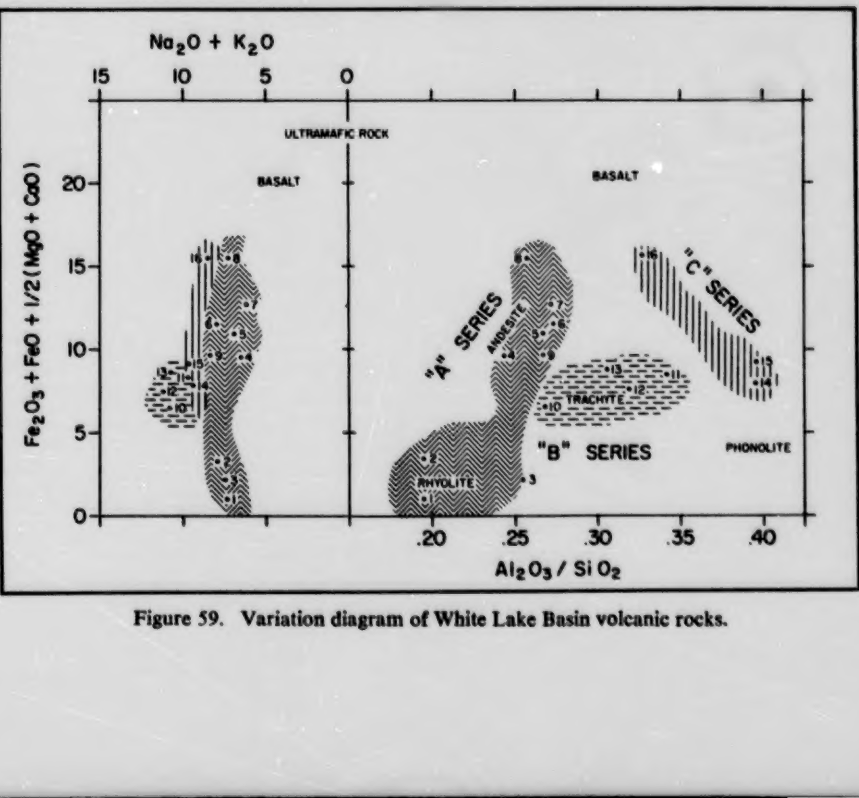


Figure 59. Variation diagram of White Lake Basin volcanic rocks.

C series, an alkaline suite consisting of Yellow Lake phonolites and mafic phonolites (two analyses) and Skaha augite porphyry alkalic basalt (one analysis).

The rocks of A series are typically siliceous, with relatively low alumina-to-silica ratios; also the rocks have only moderate total alkali content. In contrast, C series rocks are alumina-rich and silica-poor, showing relatively large alumina-to-silica ratios; B series rocks are alkali-rich but otherwise intermediate to the A and C composition extremes. A hypothetical line of silica saturation would bisect the composition field of B series; A and C compositions would fall respectively on the oversaturated and undersaturated sides of such a line.

The Tertiary volcanics of the White Lake basin clearly display a peculiar mixture of siliceous "acid-line" and aluminous-alkaline rock types. In regional perspective the rhyolite-andesite "acid-line" suite appears to be part of a discontinuous Early Tertiary andesite volcanic belt trending meridionally through central British Columbia and western Washington and Oregon. The alkaline volcanic suite seems to be genetically related to the Coryell plutonic intrusions located to the east in south central British Columbia. Together, the alkaline rocks form a distinctive petrographic province similar in many ways to the Highwood petrographic province located east of the Rocky Mountain divide in central Montana.

Table of Tertiary Formations

	Thickness in Feet
Skaha Formation	0– 900
Fanglomerate beds resting on a complex of slide breccia.	
White Lake Formation	0–3,500
Interdigitated volcanic and sedimentary rocks: White Lake sediments composed of volcanic sandstone, conglomerate, and carbonaceous shale; and White Lake volcanic rocks composed of feldspar porphyry lavas, lahars, and pyroclastics.	
Marama Formation	0–1,000
Predominantly rhyolite and rhyodacite lava with some pyroclastic rocks and local basal conglomerate.	
Marron Formation—	
Park Rill Member	200–1,500
Merocrystalline and vitric andesite lava.	
Nimpit Lake Member	400–1,000
Rosette feldspar porphyry trachyte and trachyandesite lavas.	
Kearns Creek Member	0– 400
Pyroxene-rich vesicular basaltic andesite lavas and flow breccias.	
Kitley Lake Member (51.6±1.8 m.y.)	1,000
Clot feldspar porphyry trachyte and trachyandesite lavas.	
Yellow Lake Member	500–1,800
Biotite and pyroxene feldspathic phonolite and mafic phonolite lavas and pyroclastics.	
Springbrook Formation	0– 700
Discontinuous lenses of pebble and boulder conglomerate and talus breccia.	

Table of Chemical Analyses of Tertiary Volcanic Rocks of the White Lake Basin

Oxides Recalculated to 100

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SiO_2	75.09	72.71	68.51	62.87	60.20	59.39	56.57	54.33	59.93	62.30	57.53	58.67	58.39	56.21	54.70	50.24
TiO_2	0.18	0.55	0.42	0.90	0.89	1.02	1.54	1.11	1.07	0.75	0.94	1.05	1.22	1.02	0.82	1.12
Al_2O_3	14.73	14.19	17.43	15.27	15.95	16.10	17.03	13.91	15.96	16.65	19.69	18.67	17.79	22.27	21.69	16.41
Fe_2O_3	0.63	1.42	2.33	4.75	6.11	5.98	7.15	4.82	1.73	3.81	5.13	4.91	4.32	5.19	5.40	7.51
FeO		1.00						3.25	3.92				1.33			
MnO	0.07	0.03	0.06	0.07	0.11	0.09	0.15	0.15	0.09	0.05	0.11	0.19	0.08	0.11	0.12	0.15
MgO	0.50	1.12	0.51	3.26	4.25	4.03	5.04	8.16	3.54	1.51	1.89	1.07	2.26	0.97	2.43	6.76
CaO	1.20	0.83	2.94	6.32	5.39	5.23	6.41	6.74	5.08	3.94	4.82	4.27	3.88	4.65	4.97	9.12
Na_2O	4.62	4.08	4.67	3.21	4.04	4.13	3.89	2.68	4.31	4.06	4.72	4.59	3.73	6.49	4.87	3.43
K_2O	2.98	4.07	3.13	3.35	3.06	4.03	2.22	4.85	4.37	6.93	5.17	6.58	7.00	3.09	5.00	5.26
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Oxides as Determined

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$+H_2O$	0.6	1.64	0.9	—	1.7	3.3	2.7	3.71	2.37	......	2.0	1.6	1.76	4.9	2.7	2.0
$-H_2O$		0.18		0.61				1.24	0.18	0.27			0.61			
CO_2	0.1	0.02	0.3	0.02	0.1	3.0	0.1	0.02	0.83	0.02	0.1	0.3	0.01	1.1	0.4	3.5
SrO	0.015	0.037	0.045	0.154	0.118	0.130	0.070	......	0.068	0.154	0.390	0.189	0.195	0.400	0.602	0.580
BaO	0.20	0.23	0.22	0.16	0.22	0.27	0.097	......	0.22	0.28	0.62	0.42	0.29	0.81	0.850	0.97
P_2O_5	—	—	—	0.30	......	......	—	......	......	Trace	......	......		......	—	......
Refractive index	1.499	1.502	1.508	1.538	1.539	1.549	1.553	1.541	1.568	1.517	1.535	1.534	1.529	1.556	1.555	1.582

1. Marama rhyolite, analysis No. 1, Table A-1, Church, 1967.
2. Marama rhyolite, Dusty Mac area, analysis by S. Metcalfe.*
3. Marama rhyodacite, analysis No. 2, Table A-1, Church, 1967.
4. Park Rill andesite, analysis No. 2, Table A-2, Church, 1967, and partial analysis by S. Metcalfe.*
5. Park Rill andesite, analysis No. 5, Table A-1, Church, 1967.
6. Park Rill andesite, analysis No. 4, Table A-1, Church, 1967.
7. Park Rill andesite, analysis No. 3, Table A-1, Church, 1967.
8. Kearns Creek andesite, 0.4 mile east of Yellow Lake, analysis by S. Metcalfe.*
9. White Lake andesite, Dusty Mac area, analysis by S. Metcalfe.*
10. Kitley Lake trachyte, analysis No. 1, Table A-2, Church, 1967, and partial analysis by S. Metcalfe.*
11. Kitley Lake trachyandesite, analysis No. 7, Table A-1, Church, 1967.
12. Nimpit Lake trachyte, analysis No. 8, Table A-1, Church, 1967.
13. Nimpit Lake trachyte, analysis No. 3, Table A-2, Church, 1967, and partial analysis by S. Metcalfe.*
14. Yellow Lake anorthoclase porphyry, analysis No. 10, Table A-1, Church, 1967.
15. Yellow Lake mafic phonolite, analysis No. 9, Table A-1, Church, 1967.
16. Skaha augite porphyry, analysis No. 11, Table A-1, Church, 1967.

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* Chief Analyst and Assayer, British Columbia Department of Mines and Petroleum Resources.

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BOSTOCK, H. S. (1941): *Geol. Surv., Canada,* Map 627A.
CHURCH, B. N. (1963): Unpublished thesis, *McMaster University,* 161 pp.
——— (1967): Unpublished thesis, *University of British Columbia,* 183 pp.

OKANAGAN FALLS

DUSTY MAC (No. 103, Fig. H)

By B. N. Church

LOCATION: Lat. 49°21′ Long. 119°33′ (82E/5E)
One mile east of the south end of Skaha Lake and the village of Okanagan Falls.

CLAIMS: DUSTY 1 to 16, MAC 1 to 10, and others, totalling 163.

ACCESS: The property is immediately east of Okanagan Falls on Highway 97.

OWNER: Dusty Mac Mines Ltd.

OPERATOR: NORANDA MINES, LIMITED, 1050 Davie Street, Vancouver 5 (terminated agreement at the end of September).

METALS: Gold, silver.

DESCRIPTION:

Detailed mapping shows that the rocks in the Dusty Mac area belong to the upper part of the Tertiary section exposed in the White Lake basin, namely the White Lake Formation and the older Marama Formation.

The Marama Formation crops out in the south and west parts of the map-area where it forms the high bluff, known locally as Peach Cliff, overlooking the village of Okanagan Falls. These rocks are resistant rhyolite and rhyodacite lavas.

The White Lake Formation underlies most of the area and consists of several facies. The lowermost facies rests on Marama rocks and is composed of blocky andesitic lahar beds carrying exotic blocks of Marama lava. This unit is overlain in turn by greenish, feldspathic andesite lahars and minor lavas of the same composition. The uppermost unit is exposed in the northeast part of the map-area. This consists of soft, cream-coloured pyroclastic trachyte. Lenses of carbonaceous shales and sandstones are intercalated locally with the volcanic beds.

The units described above are on the south limb of a southeasterly trending syncline. The beds have variable dips ranging from about 30 to 55 degrees northeast.

These rocks are cut by an important system of reverse faults. The system trends generally southeasterly, with interwoven easterly and southerly striking segments and splays. The direction and magnitude of movement on these faults are indicated at a number of points where large slices of Marama lava have been thrust outward and upward from the core of the syncline through several hundred feet of White Lake strata. As witnessed in the White Lake basin, reverse faulting is thought to be the result of concentric folding and accommodation of the stratigraphic pile to bedding plane slip.

At Dusty Mac, mineralization appears to be largely controlled by the fault system. Quartz veins and gossans are present in or adjacent to most of the main faults.

The main mineralized zone, located in the east central part of the property, is a gently dipping lens of quartz breccia with varying admixtures of crushed andesite. The body is exposed over a length of about 700 feet striking roughly 140 degrees with a central cross-section width of about 160 feet and a maximum thickness of 30 feet. Surface sampling of this zone by the writer showed some disseminated native silver yielding erratic grades. Assays on five composite samples gave an

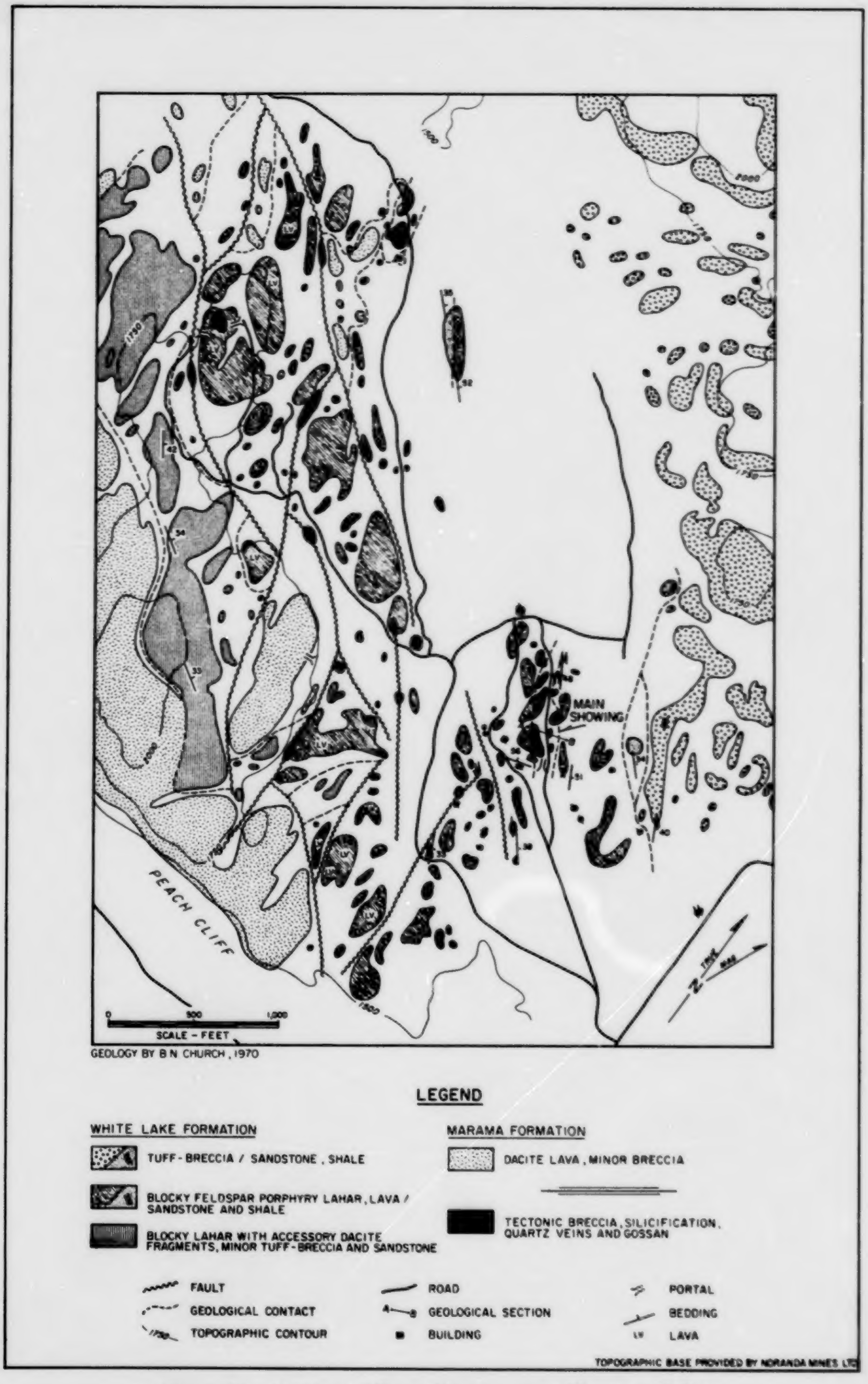
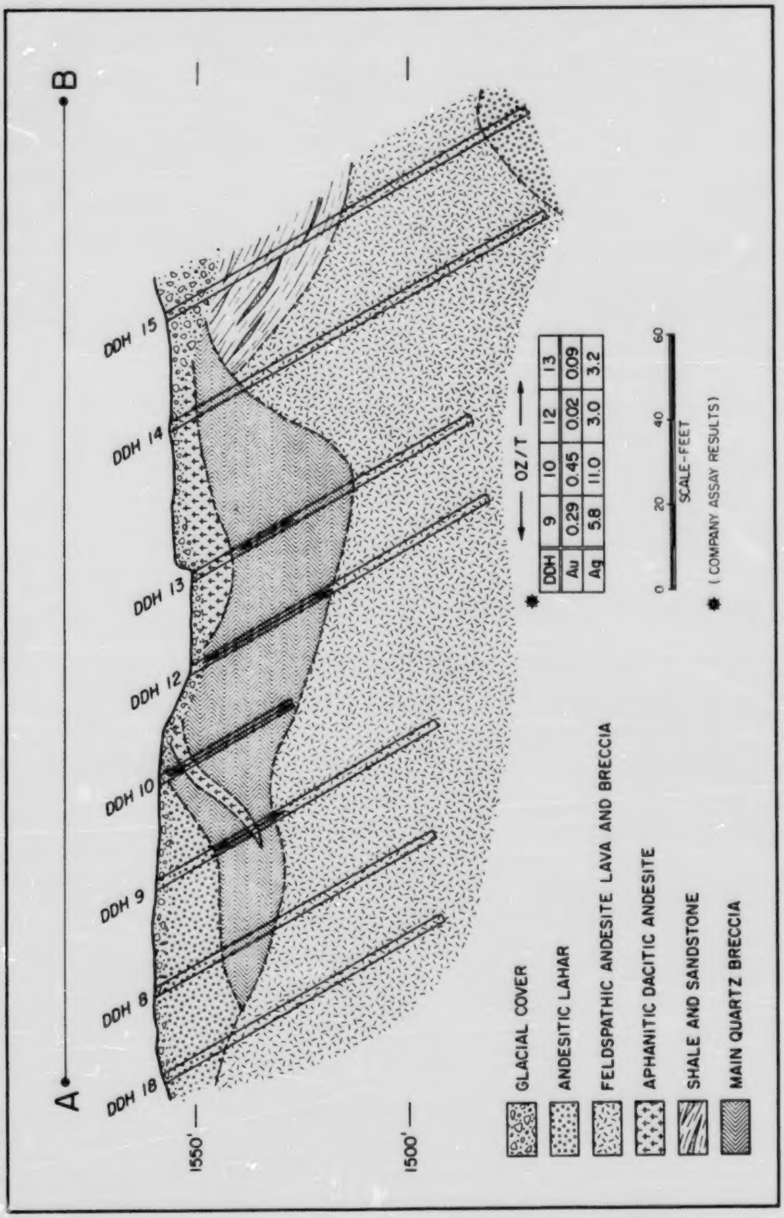

MAIN SHOWING
PEACH CLIFF
1500
1750
2000
0
500
1,000
SCALE - FEET
TRUE
MAG
N
GEOLOGY BY B.N. CHURCH, 1970
LEGEND
WHITE LAKE FORMATION
TUFF-BRECCIA / SANDSTONE, SHALE
BLOCKY FELDSPAR PORPHYRY LAHAR, LAVA / SANDSTONE AND SHALE
BLOCKY LAHAR WITH ACCESSORY DACITE FRAGMENTS, MINOR TUFF-BRECCIA AND SANDSTONE
MARAMA FORMATION
DACITE LAVA, MINOR BRECCIA
TECTONIC BRECCIA, SILICIFICATION, QUARTZ VEINS AND GOSSAN
FAULT
GEOLOGICAL CONTACT
TOPOGRAPHIC CONTOUR
ROAD
GEOLOGICAL SECTION
BUILDING
PORTAL
BEDDING
LAVA
TOPOGRAPHIC BASE PROVIDED BY NORANDA MINES LTD

Figure 60. Geology of Dusty Mac prospect, Okanagan Falls.


A
B
1550'
1500'
DDH 18
DDH 8
DDH 9
DDH 10
DDH 12
DDH 13
DDH 14
DDH 15
GLACIAL COVER
ANDESITIC LAHAR
FELDSPATHIC ANDESITE LAVA AND BRECCIA
APHANITIC DACITIC ANDESITE
SHALE AND SANDSTONE
MAIN QUARTZ BRECCIA
OZ/T
0
20
40
60
SCALE-FEET
(COMPANY ASSAY RESULTS)

DDH	9	10	12	13
Au	0.29	0.45	0.02	0.09
Ag	5.8	11.0	3.0	3.2

Figure 61. Diamond-drill hole section, Dusty Mac Mines Ltd., looking north.

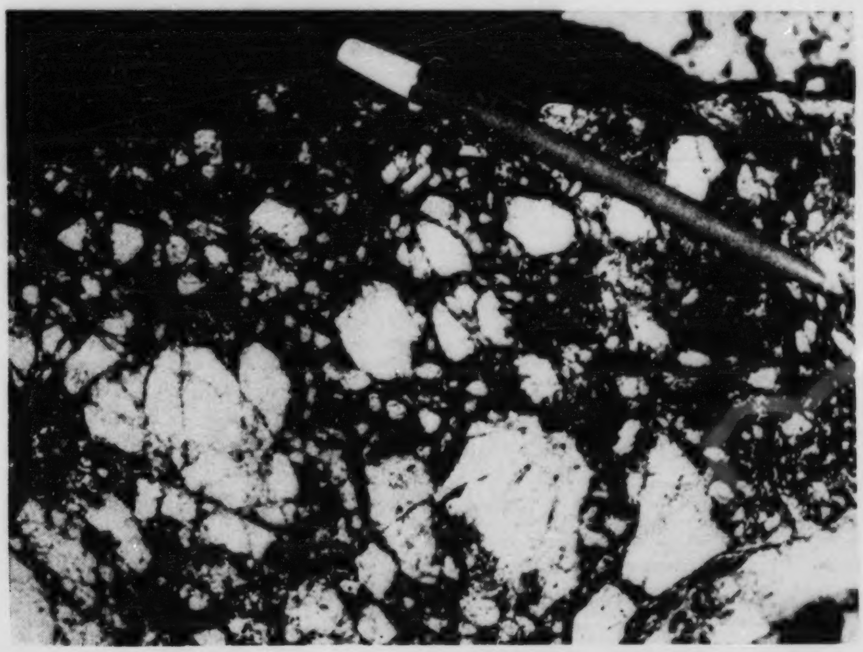


Plate XIXA.—Dusty Mac prospect. Mineralized quartz breccia.

Plate XIXB.—Dusty Mac prospect. Andesite lahar from White Lake Formation.

average value of 0.47 ounce per ton gold and 11.3 ounces per ton silver and a range of 0.02 to 4.31 ounces per ton gold and 1 to 121.4 ounces per ton silver. A published statement by Dusty Mac Mines Ltd. indicates 67,790 tons of ore averaging 0.23 ounce per ton gold and 4.97 ounces per ton silver, according to calculations based on exploration up to December 1969.

A similar large lens of quartz breccia is located about 2,500 feet northwest of the ore zone. Preliminary testing of this body shows only a trace of gold and silver.

The large quartz breccia zones, including the main mineralized zone, are thought to be the result of the following events:

(1) Development of dilations in major shears.
(2) Filling of the dilations with quartz, accompanied by gold and silver mineralization.
(3) Late-stage movement in the shear zones resulting in brecciation of the quartz and intermixing of the quartz with crushed andesite wallrocks.

WORK DONE: Work completed by Noranda Mines, Limited to the end of September includes 52 diamond-drill holes totalling 7,610 feet.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 294.

CARMI

REDCAP, SUE (No. 151, Fig. H)

LOCATION: Lat. 49°31′ Long. 119°18′ (82E/11W)
Ten miles east of Penticton, adjoining Idleback Lake to the northwest.

CLAIMS: REDCAP 1 to 12, 15 to 52; SUE 1 to 30.

ACCESS: From Penticton by the Carmi road, 10 miles.

OPERATOR: CRO-MUR MINING AND EXPLORATION CO. LTD., 414 Ellis Street, Penticton.

METAL: Molybdenum.

WORK DONE: Road construction, 4.5 miles (from Penticton–Carmi road to Idleback Lake); trenching, 450 feet on Redcap 1 to 5; stripping, 50,000 square feet on Redcap 5, 6, and 8.

VERNON MINING DIVISION

WHITEROCKS MOUNTAIN

BEAR (No. 115, Fig. H)

LOCATION: Lat. 50°00′ Long. 119°48′ (82E/13W, 82L/4W)
Between 4,000 and 5,000 feet elevation on Whiterocks Mountain, approximately 16 miles northwest of Kelowna and 15 miles northeast of Brenda mine.

CLAIMS: BEAR 1 to 23, ALFY 1 to 18, CHARLIE 1 to 16.

ACCESS: From Kelowna by four-wheel-drive vehicle, 16 miles.

OPERATOR: ATLAS EXPLORATIONS LIMITED, 330, 355 Burrard Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Disseminated chalcopyrite, pyrite, and magnetite in alkalic gabbro, some chlorite alteration.

WORK DONE: Surface geological mapping, 1 inch equals 400 feet; magnetometer survey, 20 line-miles; induced polarization survey, 15 line-miles; and geochemical soil survey, 600 samples on Alfy 5 to 18; road construction, 5 miles; trenching, 1,000 feet on Alfy 5, 6, and 17; surface diamond drilling, five holes totalling 1,200 feet on Alfy 1, 4, and 6.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 300.

ROY (No. 109, Fig. H)

LOCATION: Lat. 50°00′ Long. 119°40.5′ (82E/13E)
Around Lamby Creek and Lake, 15 miles north of Peachland.

CLAIMS: ROY 1 to 135.

ACCESS: Twenty-three miles northwest from Kelowna, by road.

OWNER: The Cariboo Gold Quartz Mining Company Limited.

OPERATORS: THE CARIBOO GOLD QUARTZ MINING COMPANY LIMITED and WILLIAMS CREEK GOLD QUARTZ MINING CO. LIMITED, 806, 475 Howe Street, Vancouver 1.

METALS: Copper, molybdenum, iron.

WORK DONE: Magnetometer and geochemical surveys; trenching, 300 feet; surface diamond drilling, one hole totalling 528 feet.

REFERENCE: Assessment Report 2737.

OKANAGAN LAKE

MAY (No. 53, Fig. H)

LOCATION: Lat. 50°20.7′ Long. 119°22.5′ (82L/6W)
On ridge northeast of Newport Creek, 2½ miles west of the north end of Okanagan Lake.

CLAIMS: MAY 7 to 29, TIKY 1 to 10, MESKY 1 to 10.

ACCESS: By road from Vernon.

OWNER: BROWN-OVERTON MINES LTD., 630, 890 West Pender Street, Vancouver 1.

METALS: Silver, lead, zinc, copper.

DESCRIPTION: Sulphides in quartz veins in Cache Creek argillites.

WORK DONE: Geochemical and ground magnetometer surveys.

REFERENCE: Assessment Report 2552.

TRINITY HILLS

EF, DK, DCK (No. 107, Fig. H)

LOCATION: Lat. 50°29.3–30.3′ Long. 118°56.3–59.3′ (82L/7W, 10W)
Between 2,100 and 4,500 feet elevation on the west slope of Trinity Hills, 10 miles northeast of Armstrong.

CLAIMS: EF 1 to 10, DK 1 to 8, DCK 301 to 306, MARTAK, NOMAD.

ACCESS: By road from Enderby, 16 miles.

OPERATOR: DAVID KING, Box 904, Vernon.

METAL: Copper.

WORK DONE: Road construction, fraction of a mile; trenching, 100 feet on Martak; stripping, 1,000 square feet on Nomad; surface diamond drilling, one hole totalling 155 feet on Nomad.

GREENWOOD MINING DIVISION

CARMI

ELK (No. 135, Fig. H)

LOCATION: Lat. 49°35.4′ Long. 119°05.5′ (82E/11E)
West and south of Arlington Lakes, 12 miles north of Beaverdell.

CLAIMS: ELK 1 to 12.

ACCESS: By road from Carmi.

OPERATOR: DURACOP MINING LIMITED, 2304, 2020 Bellevue Avenue, West Vancouver.

METALS: Gold, copper, silver, lead, molybdenum.

DESCRIPTION: Mineralization in shear zones.

WORK DONE: Claims and surface workings mapped; surface geological mapping on Elk 1 to 12.

REFERENCE: Assessment Report 2804.

REDCAP, SUE (No. 151, Fig. H)

LOCATION: Lat. 49°31′ Long. 119°18′ (82E/11W)
See report on this property, page 406.

CARMI (No. 83, Fig. H)

LOCATION: Lat. 49°27.8–31.5′ Long. 119°05.5–10.9′ (82E/6E, 11E)
At approximately 4,000 feet elevation, at Carmi, 4½ miles north-northwest of Beaverdell.

CLAIMS: Two Crown grants, Mineral Lease M-290 (nine claims), and 148 adjacent claims, including CAPCO 1 to 9, 12, 14 to 81; MARY O 1 to 12, 14 to 61; IVY, IVY 1 to 7, IVY 9 Fraction.

ACCESS: By road from Carmi.

OPERATOR: INTERNATIONAL MINERALS & CHEMICAL CORP. (CANADA) LTD., 1003, 309 Granville Street, Vancouver 2.

METALS: Molybdenum, copper.

DESCRIPTION: Molybdenite with minor chalcopyrite in altered quartz diorite-granodiorite breccia.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet on Capco 9, 12, 14 to 30, 42 to 58, 72 to 81, and Mary O 1 to 33, and 1 inch equals 200 feet on Ivy claims; induced polarization survey and magnetometer survey, 30 line-miles covering Capco 42 to 58, 72 to 81, Ivy claims, Mary O 3 to 39; geochemical survey, 200 samples covering Capco 9 to 30, Mary O 1 and 2; road construction, 2 miles on Mary O 4, 22, 23, Capco 58, 75, Ivy claims; trenching, 700 feet on Ivy 1 and 7; surface diamond drilling, 12 holes totalling 5,053 feet on Capco 42, 75, Mary O 23, Mineral Lease M-290, Ivy 1, 2, 7.

REFERENCE: *Minister of Mines, B.C.,* Ann. Rept., 1962, p. 68 (*see* FAN).

BEAVERDELL

E (No. 110, Fig. H)

LOCATION: Lat. 49°21′ Long. 119°08′ (82E/6E)
At 4,800 feet elevation, between Big Goat and Tuzo Creeks, 6 miles south-southwest of Beaverdell.

CLAIMS: E 19 to 37, 39, 41, 44, 45.

ACCESS: From Beaverdell by road, about 8 miles.

OWNER: GIANT EXPLORATIONS LIMITED, 1131 Melville Street, Vancouver 5.

METALS: Lead, zinc, copper.

DESCRIPTION: Disseminated galena, sphalerite, and chalcopyrite occur in a porphyritic monzonite phase of the West Kettle Batholith. The mineralized zone coincides with quartz-sericite alteration.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet, and geochemical soil survey, 323 samples covering all claims.

REFERENCE: Assessment Report 2730.

HIGHLAND BELL MINE (No. 141, Fig. H)

By P. E. Olson

Location: Lat. 49°26.1′ Long. 119°03.6′ (82E/6E)
The property is on the west slope of Mount Wallace, about 1 mile east of Beaverdell.

Claims: Fourteen recorded mineral claims and 32 Crown-granted mineral claims.

Access: The property is serviced by several roads from Beaverdell.

Owner: LEITCH MINES LIMITED, 300, 999 West Pender Street, Vancouver 1; mine office, Beaverdell.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done: Considerable exploration was done by way of drifting and raising, and a major diamond-drill programme was completed late in 1970 by Versatile Mining Services Ltd. under contract. The upper workings were reopened and a new level established at an elevation of 3,800 feet. This level was connected to the old Highland Bell winze which started at No. 4 level. Although some new ore was found in 1970, nothing of significance developed and ore reserves dropped very sharply. Mill grades dropped during the year. Main production came from the lower workings where salvage from old stopes was in progress. The mill treated between 100 and 125 tons per day throughout the year.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 301.

JOHN, BEV, MOSH (No. 96, Fig. H)

Location: Lat. 49°29–34′ Long. 118°56′ to 119°00′ (82E/7W, 10W)
Between 4,000 and 5,000 feet elevation on St. John and Mosher Ridges, north of Beaverdell Creek, 5 miles east of Beaverdell.

Claims: JOHN, BEV, MOSH, MAL, BUCK, DEL, SPOUT, LONEY, JACK, HELEN, totalling 288.

Access: From Beaverdell by road, 5 miles.

Owner: DeKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

Work done: Claims and topography mapped; surface geological mapping, 1 inch equals 500 feet on all claims; induced polarization survey, 10 line-miles covering Spout claims; geochemical soil survey, 6,481 samples covering all claims; road construction, 2 miles.

FUKI (No. 51, Fig. H)

Location: Lat. 49°32.4′ Long. 118°52.9′ (82E/10W)
At 3,800 feet elevation on Dear Creek, 3¼ miles west of Christian Valley and 11 miles northeast of Beaverdell.

Claims: FUKI 1 to 40, DONEN 1 to 280.

Access: By road from Beaverdell or from Westbridge via the Christian Valley road.

Owner: NISSHO-IWAI CANADA LTD., 1111 West Hastings Street, Vancouver 1.

Metal: Uranium.

Description: Uranium mineralization is found in a flat-lying zone, averaging 6 feet thick, in loosely consolidated conglomerates, shales, and sandstones that appear to lie in an old channel directly under very young Tertiary plateau basalts.

Work done: Geological and radiometric surveys, trenching, and 18 holes, totalling 3,500 feet, of diamond drilling.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 302; Assessment Report 2484.

CHRISTIAN VALLEY

SAND, CUP, LASSIE (No. 52, Fig. H)

Location: Lat. 49°36.3–40′ Long. 118°47.4–50.3′ (82E/10W)
On Sandrift and Copperkettle Creeks, between 2,850 and 4,300 feet elevation, 4 to 8 miles north of Christian Valley.

Claims: SAND 1 to 40, CUP 1 to 40, LASSIE 1 to 10.

Access: By road from Christian Valley.

Owner: HITOSHI SUGA, 702, 402 West Pender Street, Vancouver 3.

Metal: Uranium.

Description: Nothing of interest found.

Work done: Geological and radiometric surveys and 3 holes totalling 1,206 feet of diamond drilling.

Reference: Assessment Report 2482.

GUTS, CRICK (No. 11, Fig. H)

Location: Lat. 49°26′ Long. 118°55′ (82E/7W)
At approximately 4,000 feet elevation, on Gutteridge Creek, north to Crick Creek, 2 miles west of Kettle River road, 21 miles northeast of Westbridge.

Claims: Eighteen GUTS, 30 CRICK.

Access: From forestry road 7 miles north of Crouse Creek lumber-mill.

Owner: DEKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, molybdenum, zinc.

Work done: Topographical mapping, surface geological mapping, 1 inch equals 500 feet; induced polarization survey, 15 line-miles; geochemical soil survey, 1,891 samples on all claims.

BRIDESVILLE

BF, HB (No. 45, Fig. H)

Location: Lat. 49°05′ Long. 119°08′ (82E/3E)
Camp McKinney, between McKinney and Jolly Creeks, 3½ miles northeast of Bridesville, at approximately 3,500 feet elevation.

Claims: BF 1 to 14, 16, 17; HB 19, 20; HB 2 Fraction; Mineral Lease M-357 (MYRTLE, HOMESTAKE, DAISY Fraction, GEM, PORTO RECO).

Access: By road from Highway 3, 2 to 3 miles.

Owner: GUNNEX LIMITED, 1019, 409 Granville Street, Vancouver 2.

Metals: Copper, gold, silver.

Description: Widespread iron sulphides and minor copper sulphides disseminated and coating fractures in slightly skarny volcanics, parts of which are silicified.

Work done: Topographical survey; surface workings survey; surface geological mapping, 1 inch equals 200 feet on Myrtle, Homestake, Gem, Porto Reco, Daisy Fraction, HB 2 Fraction, HB 20, and BF 2, 11, and 12; magnetometer survey, 40 line-miles covering all claims; electromagnetic survey, 20 line-miles covering all claims; induced polarization survey, 3 line-miles covering Myrtle, Homestake, Daisy Fraction, Porto Reco, and HB 2 Fraction; geochemical soil survey, 1,392 samples covering all claims; road construction, one-third mile on Homestake and Daisy Fraction; surface diamond drilling, four holes totalling 571 feet on Homestake and Porto Reco.

Reference: Assessment Report 2748.

COBO (No. 48, Fig. H)

LOCATION: Lat. 49°03′ Long. 119°10′ (82E/3E)
One mile northwest of Bridesville, at 3,800 to 4,000 feet elevation.

CLAIMS: COBO 1 to 18.

ACCESS: By road up Brides Creek.

OWNER: Eberhard Mueller.

OPERATOR: SENATE MINING AND EXPLORATION LIMITED, 355 Burrard Street, Vancouver 1.

METALS: Copper, nickel.

WORK DONE: Geochemical soil survey on Cobo 9 to 14 claims.

REFERENCE: Assessment Report 2491.

ROCK CREEK

RIFF, FIR (No. 14, Fig. H)

LOCATION: Lat. 49°04′ Long. 118°59′ (82E/2W)
At 2,100 feet elevation, 1½ miles northeast of Rock Creek.

CLAIMS: Twenty-three RIFF, 8 FIR.

ACCESS: By road from Rock Creek, 2 miles.

OWNER: DEKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

METALS: Copper, nickel.

WORK DONE: Surface geological mapping, 1 inch equals 500 feet on Riff and Fir claims; induced polarization survey, 15 line-miles on Riff and Fir claims; geochemical work: 325 soil samples on Fir claims, 1,101 soil samples on Riff claims, eight rock samples on Riff claims, and two samples for spectrographic analysis on Riff claims.

DOLO (No. 9, Fig. H)

LOCATION: Lat. 49°01.3′ Long. 118°57.9′ (82E/2W)
At 3,500 feet elevation, south of Myers Creek, 3½ miles southeast of Rock Creek.

CLAIMS: DOLO 1, 2.

ACCESS: By road from Midway, 11 miles.

OWNER: NEW DOLOMITE WHITE MINING LIMITED, Box 66, Kelowna.

METALS: Magnesium, tungsten, thorium.

DESCRIPTION: Deposit is dolomite.

WORK DONE: Open cut, 25 by 6 by 12 feet, dug on Dolo 1.

BUBAR, RUBARB (No. 13, Fig. H)

LOCATION: Lat. 49°03.5–05.3′ Long. 118°53.5–55′ (82E/2W)
At 2,500 feet elevation, along Bubar Creek, 4½ miles northeast of Rock Creek Post Office.

CLAIMS: Sixteen BUBAR, 13 RUBARB.

ACCESS: From Highway 3 by gravel road for a distance of 2 miles.

OWNER: DEKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

METALS: Copper, nickel.

Work done: Surface geological mapping, 1 inch equals 500 feet and 1 inch equals 100 feet on the Bubar and Rubarb claims; induced polarization surveying, 5 line-miles on the Bubar claims; geochemical work: 1,217 soil samples on the Bubar and Rubarb claims, 14 rock samples and 425 soil samples on the Rubarb claims.

HOP, LEE, BAR (No. 10, Fig. H)

Location: Lat. 49°05–08.5′ Long. 118°52.5–54.3′ (82E/2W) At 4,000 feet elevation, between Lee and Hopper Creeks and the headwaters of Bubar Creek.

Claims: Twenty LEE, 18 HOP, 24 BAR.

Access: By trail along Nicholson Creek from Rock Creek village, 7 miles.

Owner: DeKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, lead, zinc.

Work done: Topographic mapping; surface geological mapping, 1 inch equals 500 feet and 1 inch equals 100 feet; induced polarization surveying, 12 line-miles; geochemical soil sampling, 3,409 samples on the Hop, Lee, and Bar claims; 1 mile of road constructed near Matthews Lake.

WIND, FALL (No. 12, Fig. H)

Location: Lat. 49°12–14′ Long. 118°49–52′ (82E/2W) At 4,000 feet elevation, 7 miles northeast of Westbridge, between Fiva and Windfall Creeks.

Claims: Thirty-six WIND, 36 FALL.

Access: By road 5 miles north from Westbridge, then 8 miles east by trail.

Owner: DeKALB MINING CORPORATION, 635 Sixth Avenue SW., Calgary 1, Alta.

Metals: Copper, molybdenum.

Work done: Topographic mapping; surface geological mapping, 1 inch equals 500 feet; soil sampling, 776 samples on the Wind and Fall claims.

MIDWAY

MIDWAY (No. 142, Fig. H)

By P. E. Olson

Location: Lat. 49°02.4′ Long. 118°48.5′ (82E/2W) About 2 miles north of Midway, at an elevation of 3,800 feet.

Claims: NANCY No. 1 recorded mineral claim.

Access: Via 2½ miles of jeep-road from Midway.

Owner: D. MOORE, Midway.

Metals: Gold, silver, lead, zinc.

Description: Scattered pods of silver-rich ore have been mined from an irregular fracture along a contact between diorite and schists. Mineralization is generally weak and difficult to trace.

Work done: Several short diamond-drill holes were drilled to test for possible ore zones. Some weak mineralization was intersected and further drilling is planned.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 304.

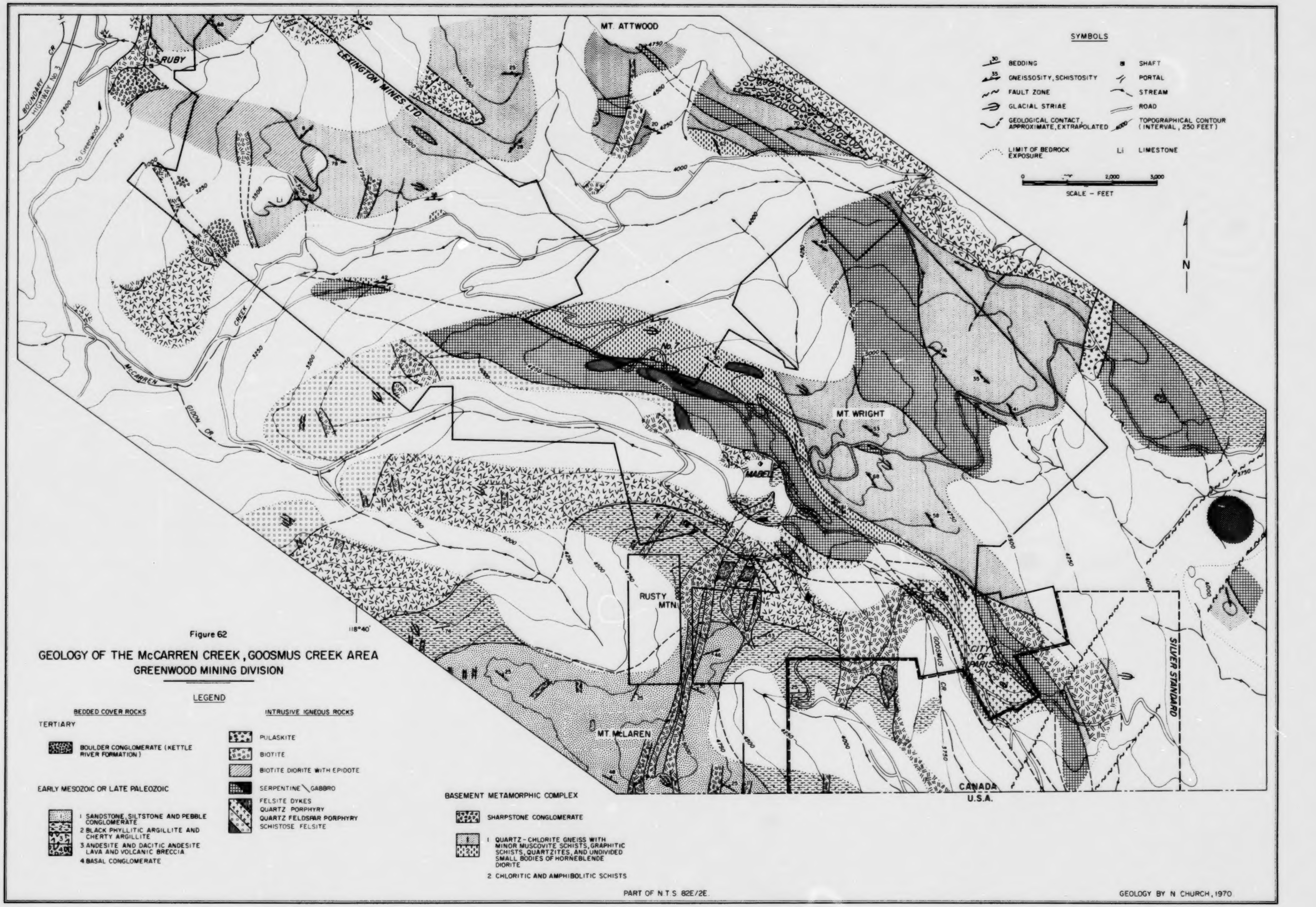


Figure 62

GEOLOGY OF THE McCARREN CREEK, GOOSMUS CREEK AREA
GREENWOOD MINING DIVISION

MT. ATTWOOD
RUBY
LEXINGTON MINES LTD.
BOUNDARY CR.
HIGHWAY No. 3
To Greenwood
McCARREN
CREEK
GIDON CR.
MT WRIGHT
MABEL
RUSTY MTN
MT. McLAREN
CITY OF PARIS
GOOSMUS CR.
SILVER STANDARD
CANADA
U.S.A.
118°40'
N
Li
2500
2750
3000
3250
3500
3750
4000
4250
4500
4750
5000
SYMBOLS
BEDDING
GNEISSOSITY, SCHISTOSITY
FAULT ZONE
GLACIAL STRIAE
GEOLOGICAL CONTACT, APPROXIMATE, EXTRAPOLATED
LIMIT OF BEDROCK EXPOSURE
SHAFT
PORTAL
STREAM
ROAD
TOPOGRAPHICAL CONTOUR (INTERVAL, 250 FEET)
Li LIMESTONE
0
1,000
2,000
3,000
SCALE - FEET
LEGEND
BEDDED COVER ROCKS
TERTIARY
BOULDER CONGLOMERATE (KETTLE RIVER FORMATION)
EARLY MESOZOIC OR LATE PALEOZOIC
1 SANDSTONE, SILTSTONE AND PEBBLE CONGLOMERATE
2 BLACK PHYLLITIC ARGILLITE AND CHERTY ARGILLITE
3 ANDESITE AND DACITIC ANDESITE LAVA AND VOLCANIC BRECCIA
4 BASAL CONGLOMERATE
INTRUSIVE IGNEOUS ROCKS
PULASKITE
BIOTITE
BIOTITE DIORITE WITH EPIDOTE
SERPENTINE \ GABBRO
FELSITE DYKES
QUARTZ PORPHYRY
QUARTZ FELDSPAR PORPHYRY
SCHISTOSE FELSITE
BASEMENT METAMORPHIC COMPLEX
SHARPSTONE CONGLOMERATE
1 QUARTZ-CHLORITE GNEISS WITH MINOR MUSCOVITE SCHISTS, GRAPHITIC SCHISTS, QUARTZITES, AND UNDIVIDED SMALL BODIES OF HORNEBLENDE DIORITE
2 CHLORITIC AND AMPHIBOLITIC SCHISTS
PART OF N.T.S. 82E/2E.
GEOLOGY BY N. CHURCH, 1970

GREENWOOD

LEXINGTON (No. 26, Fig. H)

By B. N. Church

LOCATION: Lat. 49°00.5′ Long. 118°36.5′ (82E/2E)
Six miles southeast of Greenwood.

CLAIMS: A total of 100 full claims and fractions, including 13 Crown-grants—LEXINGTON, CITY OF PARIS, LINCOLN, No. 4, FANNY H Fraction, CITY OF DENVER, CITY OF VANCOUVER Fraction, ORO, MABEL, ORO Fraction, NOTRE DAME DES MINES Fraction, PUYALLUP, GOLDEN CACHE Fraction; 14 mineral leases—CORNUCOPIA, No. 55, No. 56, FALCON, LADY OF THE LAKE, SILVER DUCK Fraction, BLACK JACK, MARIE STUART Fraction, EXCELSIOR, CUBA, NEW JACK OF SPADES, ST. LAWRENCE, ROB ROY; and 73 LEX claims and fractions.

ACCESS: Nine miles by road from Greenwood.

OPERATOR: LEXINGTON MINES LTD., 1420, 1075 West Georgia Street, Vancouver 5.

METALS: Copper, gold, silver.

DESCRIPTION:

Introduction

Central Camp, located about 6 miles southeast of Greenwood, has been the site of prospecting and mining since 1890 when the region was first explored. The object of this report is to outline the history, geological setting, and mineralization in the vicinity of the numerous old claims at the headwaters of McCarren and Goosmus Creeks, the area now largely owned or controlled by Lexington Mines Ltd.

Physiography

The area is characterized by smooth-topped hills and low mountains showing a maximum relief of about 3,000 feet. Four peaks somewhat in excess of 5,000 feet elevation—Mount McLaren, Rusty Mountain, Mount Wright, and Mount Attwood—form a divide extending northerly from the International Boundary bisecting the east central part of the area. Drainage on the southeast side of the divide flows along Goosmus Creek and tributaries of July Creek, eventually reaching the Granby River; to the northwest the streams flow into McCarren Creek and down to Boundary Creek at 2,250 feet elevation, the lowest point near the west side of the map-area.

The terrain has been broadly corrugated by southeasterly moving Pleistocene glaciers; the mean glacial striæ direction being about 120 degrees. Generally, the best bedrock exposures are at high elevations, the valleys being filled with glacial sand, gravel, and clay deposits.

Much of the west part of the area, particularly the south-facing slopes, is open ranch land. The high areas in the north and east parts have stands of pine, larch, and cedar. An old burn on the north slope of Mount Wright is covered with a thick, almost impenetrable, second growth.

The area experiences warm, dry weather during summer months and water is in short supply especially at high elevations.

History

Activity in Central Camp has focused mainly around the Crown-granted 600 by 1,500-foot claims, the City of Paris, Mabel, and No. 7.

The first significant work in the City of Paris area was in 1892 when two adjacent shafts were sunk and underground drifting began on a pyrite, chalcopyrite-rich quartz vein. At the same time another shaft was sunk to shallow depth and drifting began on a tetrahedrite-bearing quartz vein located about 600 feet to the southeast on the Lincoln claim. By 1898 the City of Paris Gold Mining Company had gained control of the property and began major underground development. Within a year a crosscut tunnel 850 feet long was driven northeast, intersecting the southeasterly trending vein system at a depth of approximately 300 feet below surface exposure. A drift was run about 600 feet to the northwest from this crosscut tunnel connecting with the City of Paris shaft; a second drift was extended 300 feet to the southeast toward the area under the Lincoln shaft. Other work included construction of an adit and 250 feet of drifting on a pyrite-chalcopyrite vein on the Lexington claim near Goosmus Creek, 2,000 feet northwest of the City of Paris portal. After a year of production, in 1900, the City of Paris mine was dormant until 1922, when prospecting began again, and in 1938 a small mineral production was realized. Again practically no exploration or development was done until 1962, when King Midas Mines Ltd. consolidated many of the old Crown-granted claims and carried out a reconnaissance geochemical survey. A short, northwesterly trending adit was driven at this time near the base of the Lincoln shaft, yielding a few tons of argentiferous ore. Lexington Mines Ltd. acquired the property in 1967 and has since engaged in an intensive exploration programme involving geochemical and induced polarization geophysical surveys, geological mapping, more than 8,000 feet of bulldozer trenching, and about 30 diamond-drill holes. Several copper zones have been uncovered and exploration of the areas appears to be continuing.

The initial work in the Mabel area consists of a number of shallow shafts and trenches opened about 1892 on small pyritiferous quartz veins and zones of pyrrhotite-bearing siliceous argillites. There is no further record of development until 1937, when interest was revived by G. H. Worthington and associates. An inclined 100-foot-deep shaft was sunk on a diorite-schist contact yielding minor gold, silver, and copper production. The principal work in recent times was performed by King Midas Mines Ltd. in the early 1960's. An adit was driven approximately 400 feet to an area below the older workings. Apparently no significant mineralization was intersected by this operation.

The prospecting and early development of No. 7 claim coincided with activity in the Mabel and City of Paris areas. By 1897, two shafts were sunk and a few hundred feet of drifting was done on No. 7 on a strong argentiferous galena-sphalerite-bearing quartz vein. Production began in 1901 and continued in 1902, accompanied by extensive underground development. In 1910 an aerial tramline was constructed connecting the mine with the railway at Boundary Falls, and production resumed under the direction and ownership of The Consolidated Mining and Smelting Company of Canada, Limited. The mine closed in 1914 and remained closed until 1934 except for a small production in 1925. W. E. McArthur subsequently leased the property and shipped ore intermittently in the period from 1934 to 1945. A detailed description of the underground workings of No. 7 mine is given by McNaughton (1945, p. 19).

Unlike the City of Paris and the Mabel prospects, no copper mineralization was found on No. 7 claim.

General Geology

The McCarren Creek, Goosmus Creek area is underlain by a southeasterly striking 1-mile-wide belt of Paleozoic(?) gneiss and schist bounded both north and south by zones of Paleozoic or Early Mesozoic metavolcanic and metasedimentary beds (*see* Fig. 62). These rocks are cut by a wide variety of igneous intrusions, including a porphyritic quartz feldspar stock and a few large serpentine and gabbro dyke-like bodies. Also, dykes and irregular-shaped diorite intrusions are found throughout the area cutting many of the units. The youngest rocks consist of a few pulaskite and basalt dykes and a small outlier of Tertiary conglomerate.

No firm isotopic or fossil dates are available. Estimated ages are determined by correlation with other regional studies and from knowledge of the cutting relationships of igneous intrusions and the metamorphic history of the various rocks underlying the map-area.

Basement Metamorphic Complex

The rocks of the gneiss-schist belt form a basement complex similar to the Shuswap crystalline series of the Okanagan Valley. These rocks are well displayed on Mount Wright and on the hills in the northwest part of the map-area. They consist mainly of thinly layered quartz-chlorite gneiss, massive lenses of pure meta-quartzite and graphitic quartzite, minor muscovite schist and carbonated schists, and a prominent zone of chlorite-amphibole schist.

Sharp-crested, shallow-plunging folds are locally well developed in the laminated units. The gneissosity and foliation are generally inclined to the northeast, with dips ranging from about 20 to 60 degrees.

An epidotized quartz breccia found in the west part of the area is tentatively assigned to the basement complex. The rock superficially resembles cataclastic zones found in the quartz-chlorite gneiss; however, detailed examination shows that the unit is probably a recrystallized conglomerate similar to the "sharpstone conglomerates" near Phoenix.

Bedded Rocks

An assortment of volcanic and sedimentary units which are probably of Late Paleozoic or Early Mesozoic age overlie the basement complex. The most complete section is found on Mount McLaren and Rusty Mountain, where three units are identified—a lower zone of basalt and andesite lava, an intermediate zone of carbonaceous phyllite, and an upper zone of quartz wacke and conglomerate—the total sequence being more than 1,000 feet thick. The over-all disposition of the units is almost horizontal, although some beds are steeply inclined on the limbs of minor folds. The phyllite is generally markedly wrinkled, with crenulations plunging gently to the east and west.

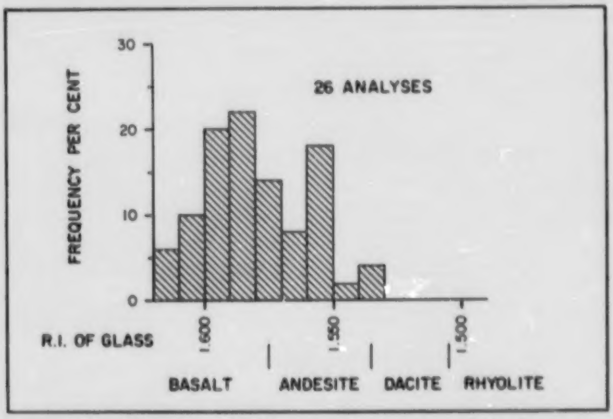


Figure 63. Composition frequency distribution of volcanic rocks in McCarren Creek area.

The contact between these rocks and the basement complex is obscured by igneous intrusions and cover; however, the relations are clear in the northeast part of the map-area. On the southeast slopes of Mount Attwood, basic lavas and breccias similar to those in the Mount McLaren-Rusty Mountain area overlie and are intercalated with basal conglomerate which rests unconformably on the basement schists and gneiss. Elsewhere the volcanic rocks appear to rest directly on basement gneisses.

The youngest beds in the map-area consist of a small outlier of weakly indurated Tertiary conglomerate (Kettle River Formation?), located about 1 mile east of Mount Wright. The pebbles and boulders are composed of diorite, andesite, felsite, limestone, and many other varieties representing older units found in the map-area, including a large number of serpentine fragments similar to the immediately underlying rock.

Intrusive Igneous Rocks

Acid intrusions (Early Mesozoic?)—The oldest rocks, probably Early Mesozoic age, consist of an assemblage of genetically related small stocks and hypabyssal acid intrusions mapped variously as quartz feldspar porphyry, quartz porphyry, felsite, and schistose felsite.[*] The largest of these intrusions is a wedge-shaped quartz feldspar porphyry stock located near the confluence of McCarren Creek and Gidon Creek in the southwest part of the map-area. Petrographically, the rock consists of large tabular phenocrysts of orthoclase (3 to 10 millimetres in diameter) surrounded by smaller plagioclase plates (1 to 4 millimetres in diameter) and subhedral quartz crystals (1 to 4 millimetres in diameter) suspended in a fine-grained matrix. Modal analysis of four samples shows the following average compositions:

Phenocrysts	Per Cent	*Matrix*	Per Cent
Quartz	5	Quartz and feldspar	25
Perthitic orthoclase	15	Epidote, calcite, sphene, and magnetite	10
Plagioclase	45		

The north edge of the intrusion is deflected to the east parallel to the south contact of the basement complex and along the margin of a large serpentine dyke. In the vicinity of No. 7 mine a cataclastic phase of the rock, referred to as schistose felsite, is cut by the serpentine.

An elongated quartz porphyry intrusion cropping out along the course of Goosmus Creek appears to be an easterly extension of the quartz feldspar stock. Petrographically, the intrusion displays a number of facies, including a fine-grained chilled selvage and a fine-grained phase resulting from cataclasis. The typical porphyry phase contains subhedral quartz phenocrysts and composite quartz eyes (2 to 7 millimetres in diameter) set in a matrix of small rectangular plagioclase crystals (1 to 2 millimetres in diameter), chloritized biotite, and interstitial fine-grained quartz and feldspar (*see* Plate XXA). Quartz phenocrysts rarely exceed 10 per cent of the rock; however, according to calculations based on chemical analysis, normative quartz is about 35 per cent; presumably about 25 per cent of the quartz is in the matrix (*see* analysis 1). Characteristically, potassium feldspar is scarce and occurs as thin mantles on plagioclase grains or discrete grains in the matrix. Where the rock is badly sheared the quartz and especially the feldspar is reduced to small fragments, the feldspar being readily altered to sericite and clay minerals.

Ultramafic and basic intrusions (Cretaceous?)—The acid igneous rocks are intruded by a large Cretaceous(?) serpentine dyke-like body which extends north-

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[*] The relative age of a number of small amphibolitic diorite and gabbro dykes found in the basement complex is unknown, conceivably they could predate the acid intrusions.

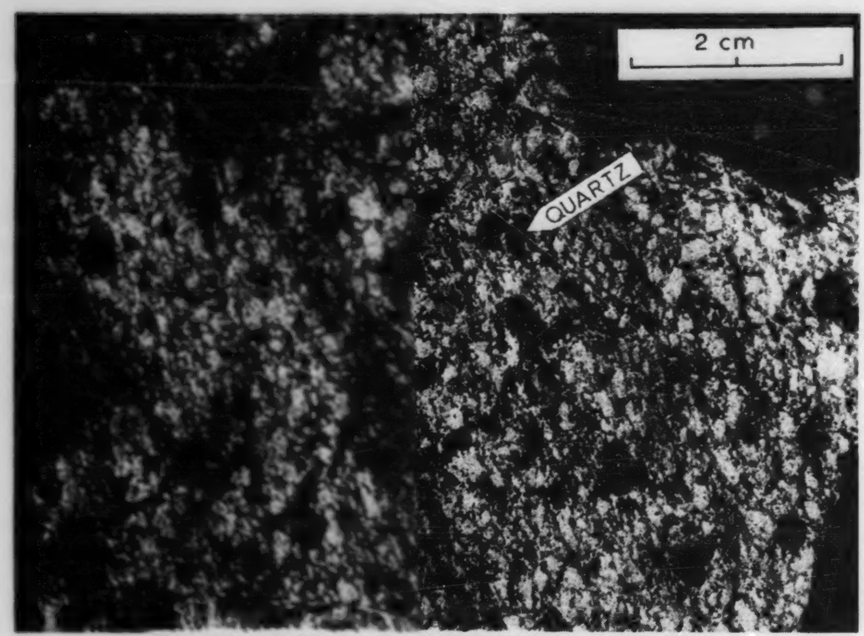


Plate XXA.—Polished section of the Lexington quartz porphyry.

Plate XXB.—Lincoln vein, City of Paris area.

west from the vicinity of the Lone Star mine south of the International Boundary to McCarren Creek, a distance of about 4½ miles. A similar intrusion of about the same size passes through Mount Wright and the northeast part of the map-area. A few isolated serpentine lenses are found elsewhere in the basement complex apparently intruded concordantly into the schists and gneisses.

The serpentine is somewhat variable lithologically. Freshly broken surfaces are commonly brittle and dark green or black except in shear zones, where the rock is often bright green with a greasy lustre. Weathered surfaces are soft and mottled rust brown or more commonly light grey; the light-coloured surfaces are deceptively similar to siliceous plutonic rocks or even quartzite when viewed from a distance.

Thin-section analysis shows that the rock is composed almost entirely of feathery and platy serpentine minerals with veins and disseminations of magnetite, patches of carbonates, and a few pyroxene relicts. In a few sections textures are preserved and it is clear that the serpentine is pseudomorphic after subhedral olivine and pyroxene grains, the original rock being a peridotite.

A small outcrop of gabbro near the east boundary of the map-area is clearly related to the adjacent serpentine intrusion. The rock is abnormally light coloured, owing to retrograde alteration and weathering. Thin-section analysis shows that the rock consists of about 60 per cent plagioclase (labradorite), plus alteration products, and 40 per cent pyroxene (mainly augite). The pyroxene crystals (1 to 3 millimetres in diameter) are commonly subhedral or anhedral, some grains being completely surrounded by plagioclase. The plagioclase is extensively altered to clay minerals and some zoisite; the pyroxene appears to be more resistant and shows only slight chloritization.

Diorite (Early Tertiary)—A series of fine- to medium-grained diorite dykes and a number of irregular-shaped intrusions are found throughout the area. These rocks or normally very fresh and are correlated with the Early Tertiary Scatter Creek Formation described by Parker and Calkins (1964) in the Republic and Curlew areas of Washington State.

An unusually high concentration of diorite dykes is found on Rusty Mountain and Mount McLaren in the south part of the map-area. These trend northerly subparallel to a prominent set of cross-joints. North of Goosmus Creek the dykes coalesce to form irregular-shaped bodies against the older northwesterly striking serpentine intrusion.

In the northwest part of the map-area the diorite cuts the acid intrusions and units of the metamorphic complex, including the epidotized sharpstone conglomerates on the Ruby claim.

Petrographically, the rock is best described as a microporphyritic alkali-rich diorite. In thin-section the rock consists of plagioclase laths 1 to 4 millimetres long and subhedral biotite and pyroxene. Microphenocrysts set in a fine-grained matrix of randomly oriented laths of potassium feldspar and plagioclase with interstitial wedges of quartz, scattered biotite, and magnetite. A well-developed sample shows the following mineral composition:

Microphenocrysts	Per Cent	*Matrix*	Per Cent
Plagioclase (An_{40-45})	20	Quartz	15
Orthoclase	2	Feldspar	45
Biotite	5	Biotite	3
Augite	2	Pyroxene	2
		Magnetite	1
		Alteration minerals	5

Sodium cobaltinitrite stain tests performed on the rock indicate about 15 per cent potassium feldspar. Chemical analysis of a sample obtained from a diorite dyke south of the Mabel portal is intermediate to Daly's (1933) average quartz monzonite and quartz diabase (*see* analyses 2 and 3).

Table of Chemical Analyses

Oxides Recalculated to 100—	1	2	3
SiO_2	72.44	60.27	60.35
TiO_2	0.41	1.08	1.18
Al_2O_3	16.25	14.70	14.85
Fe_2O_3	0.73	2.08	3.53
FeO	1.78	4.04	5.45
MnO	0.01	0.09	0.14
MgO	1.13	4.30	3.11
CaO	0.01	5.89	5.86
Na_2O	5.63	3.82	3.05
K_2O	1.61	3.73	2.48
	100.00	100.00	100.00
Oxides as Determined—			
BaO	0.05	0.31	
SrO	0.03	0.14	
H_2O+	3.42	2.92	
H_2O-	0.17	0.07	
CO_2	0.06	0.12	
P_2O_5	0.10	0.54	
SO_3	0.08	0.06	
Molecular Norms—			
Quartz	35.13	6.17	
Orthoclase	8.51	21.99	
Albite	45.40	34.14	
Anorthite	0.03	11.95	
Wollastonite	.....	6.87	
Enstatite	3.06	11.84	
Ferrosilite	1.51	3.44	
Ilmenite	0.51	1.38	
Magnetite	0.69	2.16	
Unassigned	5.16	0.06	

1. Quartz porphyry, 500 feet south of the Lincoln portal, analysis by S. Metcalfe and R. S. Young, British Columbia Department of Mines and Petroleum Resources.
2. Biotite diorite, approximately 1,000 feet south of the Mabel portal, analysis by S. Metcalfe and R. S. Young, British Columbia Department of Mines and Petroleum Resources.
3. Average of Daly's (1933) quartz monzonite and quartz diabase, Table 1, Average Composites 44 and 68, pages 15 and 18.

A slightly older diorite body of about the same texture and composition is exposed in the area south of the Ruby claim. The rock displays some chlorite and epidote retrograde alteration and is cut by a fresh diorite dyke.

A peculiar melanocratic variety of the diorite is found in a few trenches on the Lexington, Lincoln, and Puyallup claims and in a road cut about 1,000 feet northeast of No. 7 mine. This rock weathers remarkably, readily forming a deep regolith composed of dark-brown granular fragments. A thin-section prepared from a relatively fresh sample from the Lincoln portal shows a higher concentration of apatite and much less quartz than the normal diorite. The alteration and replacement minerals are mainly chlorite, clay minerals, and carbonates.

Minor hypabyssal Tertiary intrusions—A series of scattered intrusions, petrographically similar to lavas of the Marron Formation cropping out near Midway west of Greenwood, are considered to be among the youngest igneous rocks in the map-area.

The largest intrusion is located about 1 mile northeast of Mount Wright, at the contact between serpentine and older andesitic volcanics. The rock varies somewhat from place to place; however, it is usually light brown with scattred phenocrysts of feldspar (1 to 15 per cent), pyroxene (less than 5 per cent), and biotite (less than 5 per cent). Commonly, two feldspars are present, intermediate plagioclase and sanidine, occurring both as solitary and composite subhedral crystals 1 to 6 millimetres in diameter. The pyroxene is light-green diopsidic augite, which forms rounded corroded crystals and glomerophenocrysts, one-half to 5 millimetres in diameter, with numerous magnetite and apatite inclusions. Biotite occurs as subhedral brown books one-quarter to 2 millimetres in diameter. The matrix is generally glassy or felted with sanidine and plagioclase laths or stubby plates with interstitial biotite and minor quartz.

The term "pulaskite" is used to describe these aluminous alkali-rich intrusions in keeping with the nomenclature of Daly, 1912 (*see* p. 419). According to recent mapping by Monger (1968), the extrusive equivalent of the pulaskite is trachyandesite lava near the middle of the Tertiary volcanic pile at Midway. Mathews (1964) obtained potassium-argon radiometric dates of 49±2 million years on a tuff bed underlying the trachyandesite lava and 48±2 million years on a pulaskite dyke in the same general area.

Dark hornblende porphyry dykes thought to be equivalent to some of the uppermost Tertiary lava flows in the Midway area are on the northwest spur of Rusty Mountain and cutting the serpentine at No. 7 mine. The fresh rock consists of scattered, greenish-brown hornblende phenocrysts measuring up to 3 millimetres long set in a fine-grained matrix of randomly arranged plagioclase plates with minor interstitial magnetite and a few grains of quartz. At No. 7 mine these dykes are locally albitized and silicified and the hornblende phenocrysts are replaced by biotite.

Mineralization

Prospecting in Central Camp has traditionally focused on gold- and silver-bearing quartz veins; however, current exploration is directed toward the copper mineralization, mainly the low-grade chalcopyrite disseminations and fracture-fillings associated with the acid intrusions. The cupriferous skarns that have attracted general attention in the Greenwood region for many years are scarce in Central Camp, occurring only in the west part of the map-area near the Ruby claim.

The major veins and vein systems—The main veins are found at the contacts of the most southerly of the large serpentine intrusions. The veins are usually discontinuous and lenticular, having undergone extensive shearing in places. Some of the important accessory mineral assemblages in the veins include pyrite-galena-sphalerite, pyrite-chalcopyrite, and, less commonly, tetrahedrite.

No. 7 mine is on the most productive vein. This is located on a ridge south of McCarren Creek near the centre of the map-area. According to British Columbia Department of Mines Index No. 3, the two periods of production between 1901 to 1910 and 1934 to 1945 yielded 15,152 tons of ore grading 0.2 ounce per ton gold, 6.59 ounces per ton silver, 0.7 per cent lead, and 0.05 per cent zinc.

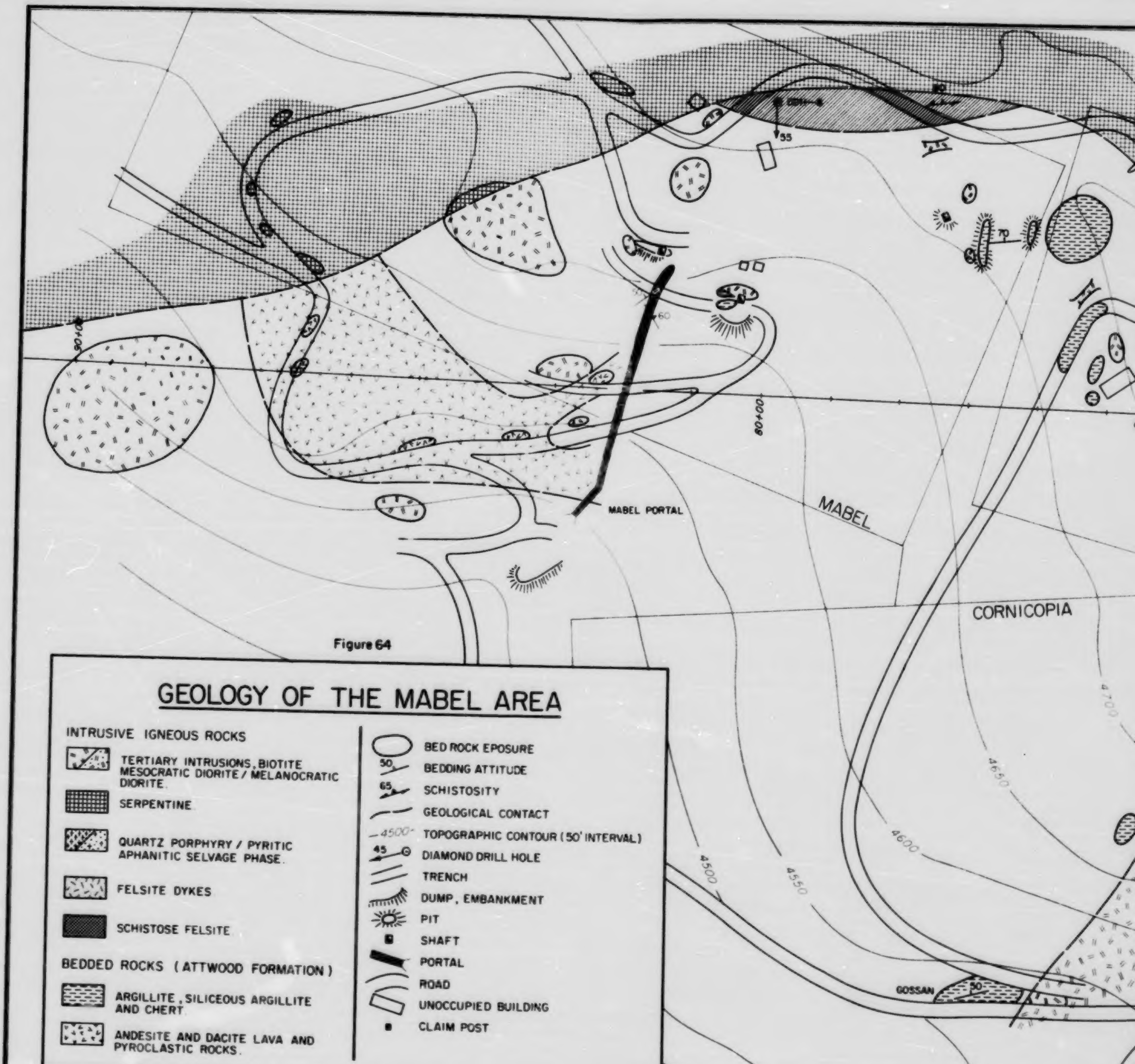
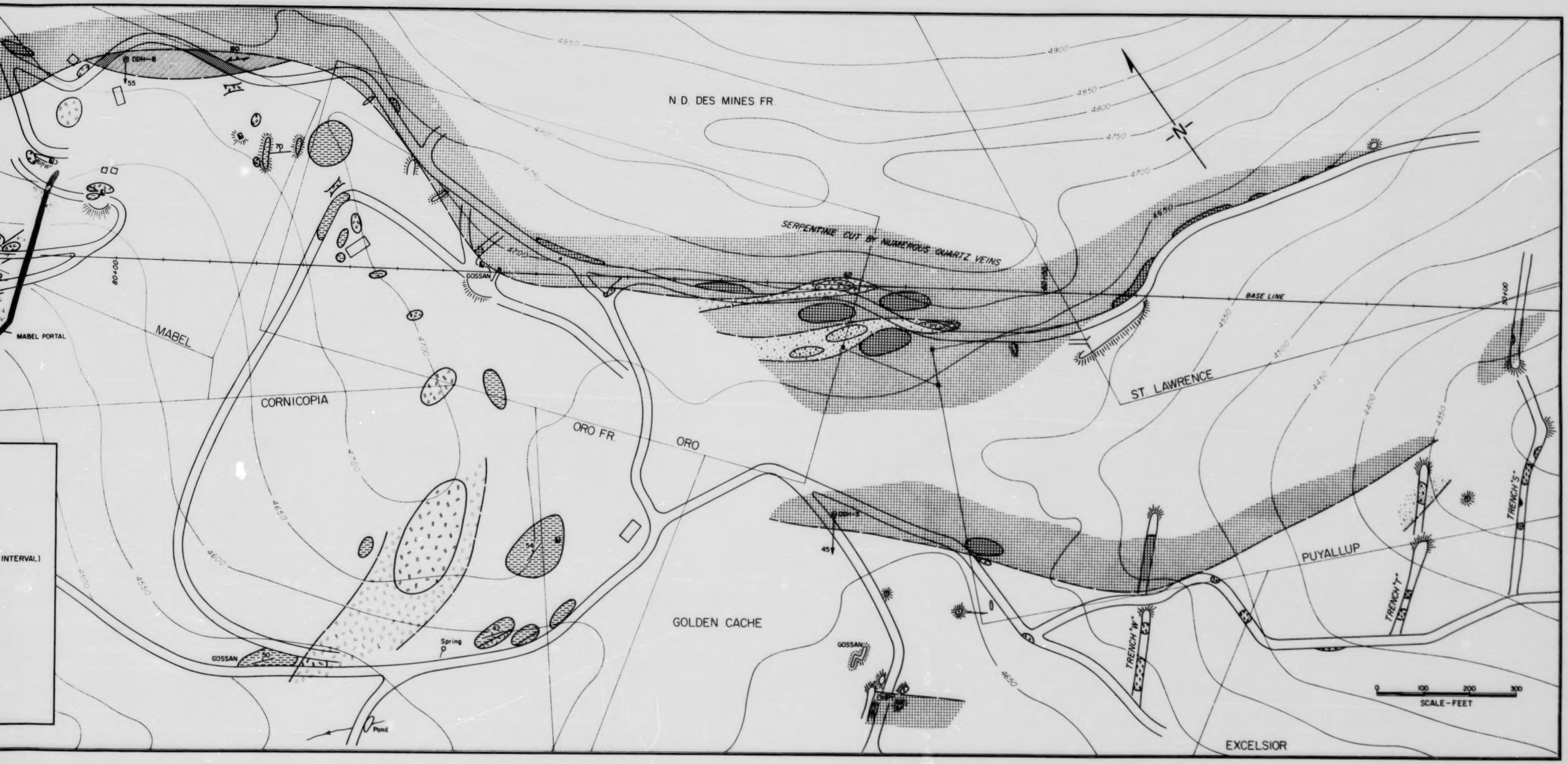


Figure 64

GEOLOGY OF THE MABEL AREA

INTRUSIVE IGNEOUS ROCKS
TERTIARY INTRUSIONS, BIOTITE MESOCRATIC DIORITE / MELANOCRATIC DIORITE.
SERPENTINE.
QUARTZ PORPHYRY / PYRITIC APHANITIC SELVAGE PHASE.
FELSITE DYKES
SCHISTOSE FELSITE
BEDDED ROCKS (ATTWOOD FORMATION)
ARGILLITE, SILICEOUS ARGILLITE AND CHERT.
ANDESITE AND DACITE LAVA AND PYROCLASTIC ROCKS.
BED ROCK EPOSURE
50 BEDDING ATTITUDE
65 SCHISTOSITY
GEOLOGICAL CONTACT
4500 TOPOGRAPHIC CONTOUR (50' INTERVAL)
45 DIAMOND DRILL HOLE
TRENCH
DUMP, EMBANKMENT
PIT
SHAFT
PORTAL
ROAD
UNOCCUPIED BUILDING
CLAIM POST
MABEL PORTAL
MABEL
CORNICOPIA
GOSSAN
DDH-6
55
60
70
50
30
00+00
80+00
4500
4550
4600
4650
4700


N.D. DES MINES FR.
SERPENTINE CUT BY NUMEROUS QUARTZ VEINS
N
DDH-8
55
70
80+00
GOSSAN
MABEL PORTAL
MABEL
CORNICOPIA
ORO FR.
ORO
BASE LINE
ST. LAWRENCE
DDH-5
45
PUYALLUP
GOLDEN CACHE
GOSSAN
Spring
Pond
54
43
50
TRENCH "W"
TRENCH "T"
TRENCH "S"
EXCELSIOR
INTERVAL)
4900
4850
4800
4750
4700
4650
4600
4550
4500
4450
4400
4350
0
100
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SCALE-FEET

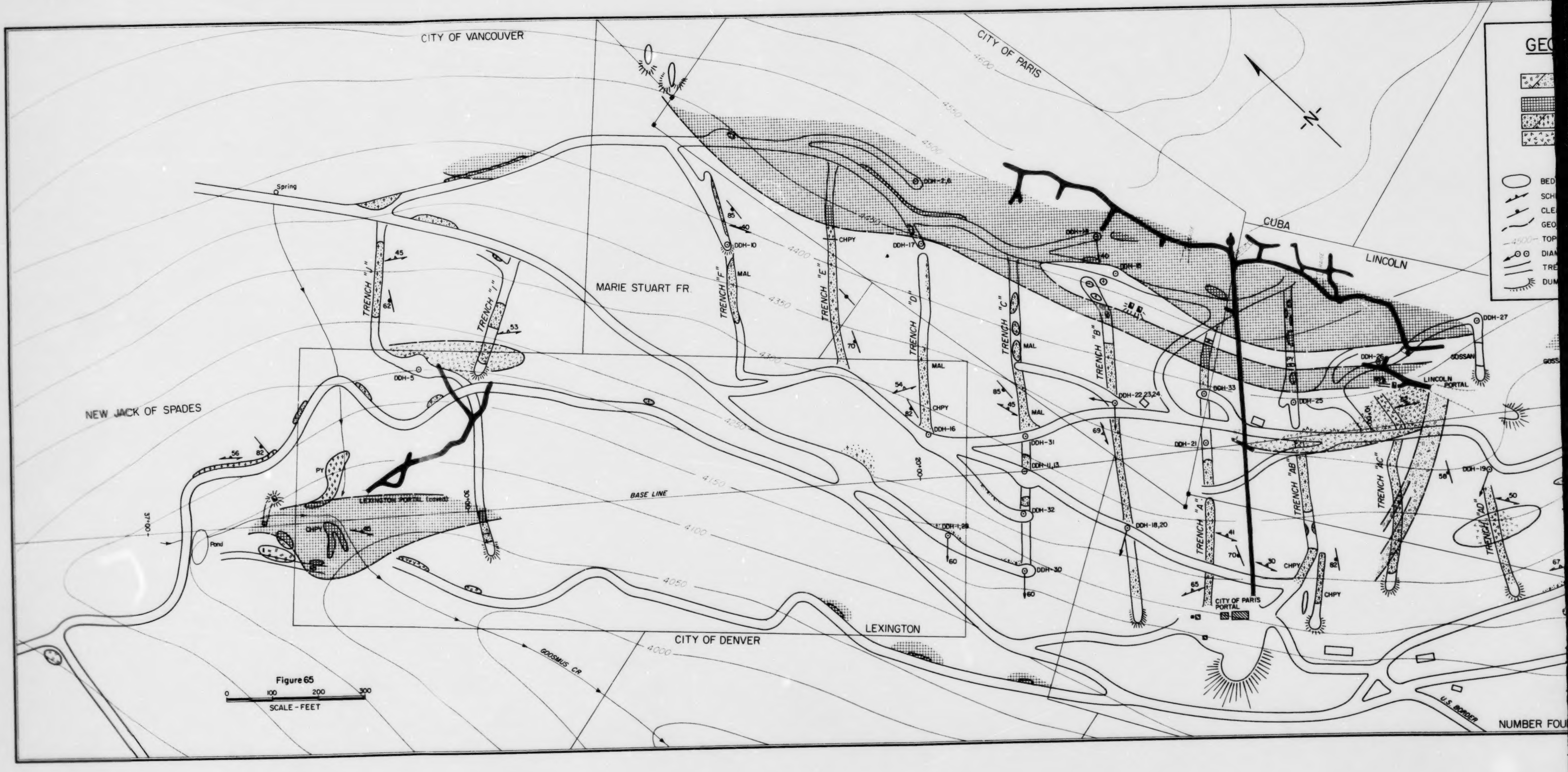
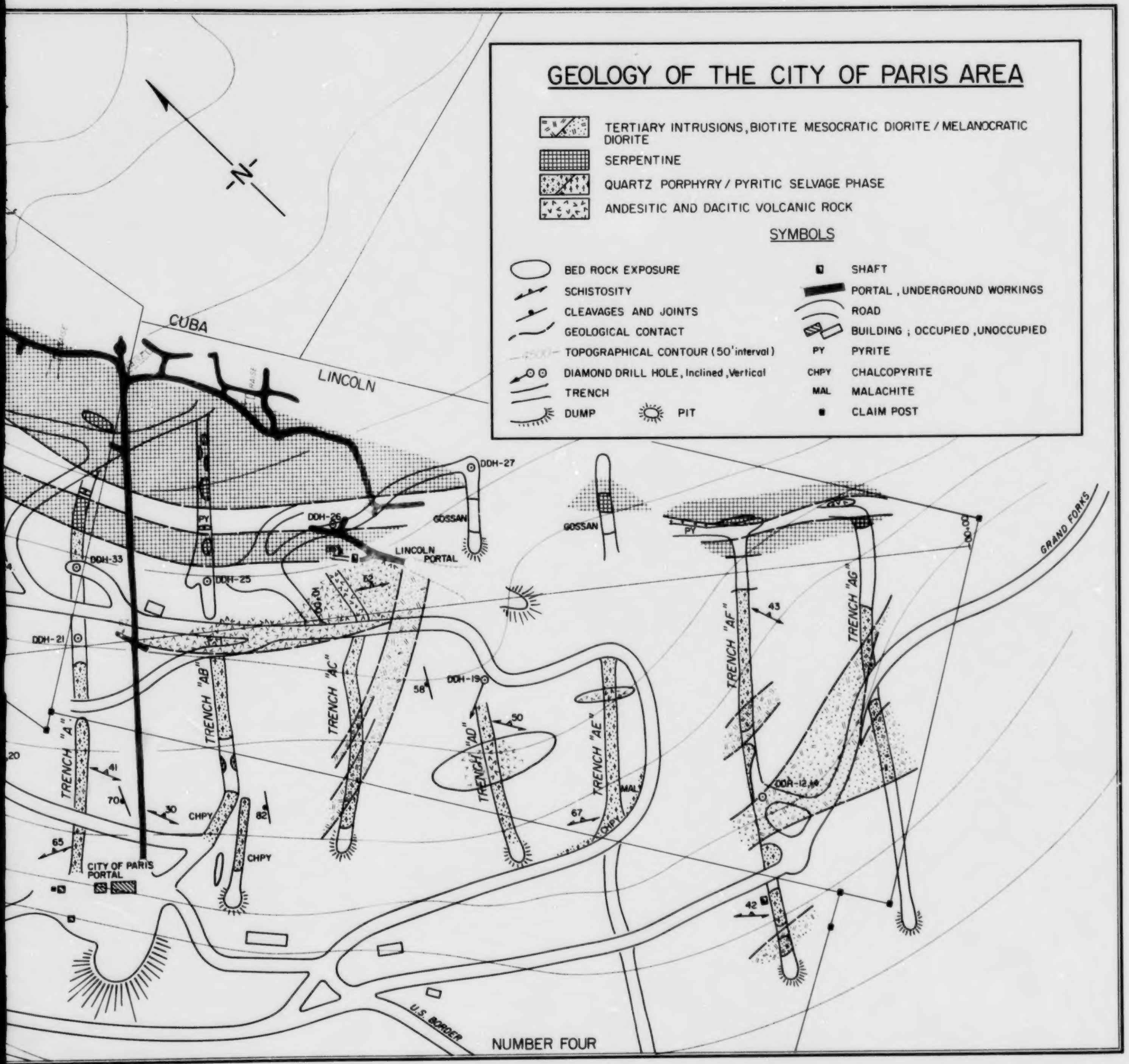

CITY OF VANCOUVER
CITY OF PARIS
CUBA
LINCOLN
MARIE STUART FR.
NEW JACK OF SPADES
CITY OF DENVER
LEXINGTON
NUMBER FOU
N
GEO
BED
SCH
CLE
GEO
TOP
DIAM
TRE
DUM
4600
4550
4500
4450
4400
4350
4300
4250
4150
4100
4050
4000
-4500-
Spring
Pond
BASE LINE
GOOSMUS CR
U.S. BORDER
TRENCH "J"
TRENCH "I"
TRENCH "F"
TRENCH "E"
TRENCH "D"
TRENCH "C"
TRENCH "B"
TRENCH "A"
TRENCH "AB"
TRENCH "AC"
TRENCH "AD"
LEXINGTON PORTAL (caved)
CITY OF PARIS PORTAL
LINCOLN PORTAL
GOSSAN
GOSS
DDH-2,8
DDH-5
DDH-10
DDH-17
DDH-16
DDH-1,28
DDH-30
DDH-31
DDH-11,13
DDH-32
DDH-22,23,24
DDH-18,20
DDH-21
DDH-33
DDH-25
DDH-26
DDH-27
DDH-19
PY
CHPY
MAL
37+00
20+00
30+00
45
62
53
85
40
70
54
82
65
69
41
30
50
67
56
58
60

Figure 65

0
100
200
300
SCALE - FEET


GEOLOGY OF THE CITY OF PARIS AREA
TERTIARY INTRUSIONS, BIOTITE MESOCRATIC DIORITE / MELANOCRATIC DIORITE
SERPENTINE
QUARTZ PORPHYRY / PYRITIC SELVAGE PHASE
ANDESITIC AND DACITIC VOLCANIC ROCK
SYMBOLS
BED ROCK EXPOSURE
SCHISTOSITY
CLEAVAGES AND JOINTS
GEOLOGICAL CONTACT
TOPOGRAPHICAL CONTOUR (50' interval)
DIAMOND DRILL HOLE, Inclined, Vertical
TRENCH
DUMP
PIT
SHAFT
PORTAL, UNDERGROUND WORKINGS
ROAD
BUILDING; OCCUPIED, UNOCCUPIED
PY PYRITE
CHPY CHALCOPYRITE
MAL MALACHITE
CLAIM POST
N
CUBA
LINCOLN
GRAND FORKS
DDH-27
DDH-26
GOSSAN
LINCOLN PORTAL
DDH-33
DDH-25
DDH-21
DDH-19
DDH-12,14
PY
TRENCH "A"
TRENCH "AB"
TRENCH "AC"
TRENCH "AD"
TRENCH "AE"
TRENCH "AF"
TRENCH "AG"
CHPY
MAL
CITY OF PARIS PORTAL
U.S. BORDER
NUMBER FOUR
43
58
50
41
70
30
82
67
65
42
20

The vein crops out along the north contact of a narrow appendage of the serpentine intrusion. It ranges from a few inches to 5 feet wide and has been traced for about 1,000 feet, striking 115 degrees and dipping between 40 and 65 degrees northeast. The vein is thought to be Tertiary, about the same age as the silicified and albitized pulaskite and hornblende porphyry dykes found in the same area.

The City of Paris mine is on a vein system near the south contact of the serpentine intrusion, about 2 miles southeast of No. 7 mine. The vein system consists of two somewhat discontinuous subparallel veins developed along the margins of a narrow serpentine dyke-like protuberance, an offshoot flanking the main serpentine intrusion. The system is exposed at intervals over a length of roughly 1,500 feet, showing a variable strike ranging between 140 and 170 degrees, with an over-all dip of about 55 degrees northeast.

The City of Paris vein which follows the northeast side of the serpentine "dyke" appears to have been the source of much of the ore. The production amounting to only 2,124 tons was mostly in the year 1900, the average grade being 0.4 ounce per ton gold, 2.11 ounces per ton silver, 3.14 per cent copper, 0.03 per cent lead, and 0.007 per cent zinc. A grab sample taken by the writer from a small pit on the vein about 125 feet northwest of the Lincoln shaft assayed: Gold, 0.06 ounce per ton; silver, 53.2 ounces per ton; copper, 1.84 per cent; lead, 3.98 per cent; zinc, 0.12 per cent; arsenic, 0.073 per cent; and antimony, 0.93 per cent.

The Lincoln vein is exposed on the south side of the serpentine dyke and appears to be the vein followed by the main northwest drift on the bottom level of the mine (*see* Plate XXB). In general the metal values are sporadic, some of the best assay results being obtained from the Lincoln shaft and portal area. According to the Minister of Mines Annual Report for 1897 (p. 585), a sample from the bottom of the shaft assayed: Gold, 0.15 ounce per ton ($3) and silver, 22.5 ounces per ton. A small shipment of ore from the Lincoln portal in 1960 averaged 0.5 ounce per ton gold and 83.8 ounces per ton silver.

Veins, silicified zones, and replacements—The so-called Mabel veins are located between the No. 7 and the City of Paris areas (*see* Fig. 64). These veins consist of a series of small, auriferous quartz stringers which were actively prospected in 1897 and again in 1937. The only production from the area was in 1937, when an inclined shaft was sunk on a narrow zone of silicified schist yielding 117 tons of ore with low gold, silver, and copper values.

A detailed examination of the Mabel area by the writer shows that some of the silicified zones and quartz stringers are related to broader, replacement-type sulphide deposits apparently associated with large Tertiary diorite dykes. The replacements occur as thin pyrite-pyrrhotite layers in laminar-bedded siliceous argillites or ill-defined zones of more massive sulphides. Analysis of a pyrrhotite-rich composite sample from a 15-foot-wide replacement lens exposed on the main road south of the Mabel portal shows 15.04 per cent iron, 0.05 per cent copper, and only a trace of gold and silver.

Fracture-fillings and disseminated sulphide mineralization—Current exploration is focused on the widespread, low-grade copper mineralization associated with the quartz porphyry intrusion in the City of Paris area (*see* Fig. 65). This mineralization is contained roughly within a 3,000-foot-long, 1,000-foot-wide segment of the quartz porphyry exposed between the main serpentine intrusion and a somewhat smaller serpentine body near Goosmus Creek. The principal mode of occurrence of the main minerals, pyrite and chalcopyrite, is in fractures and disseminations and to less extent in quartz stockworks. The rock is commonly leached at the surface, with fracture faces being coated with limonite and malachite or black manganese oxide.

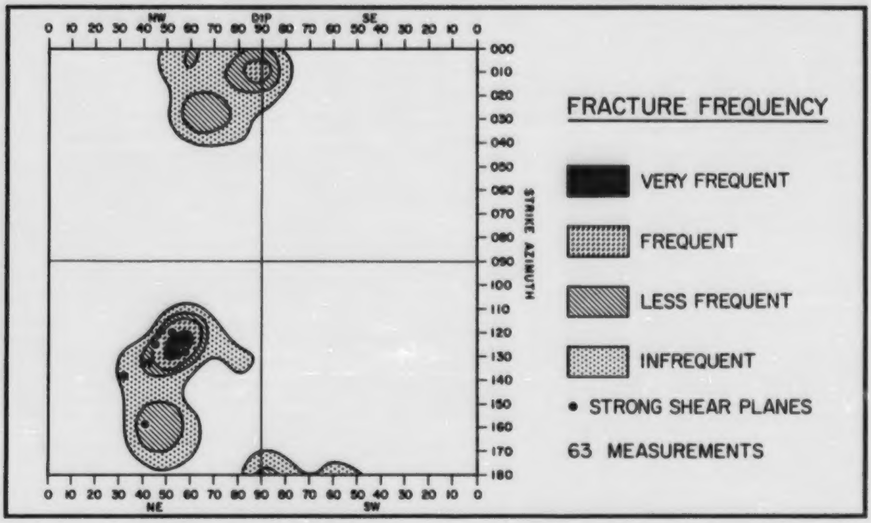


Figure 66. Lexington Mines Limited, a statistical plot of fractures in the quartz porphyry unit, City of Paris area.

Fractures are strongly developed locally and the intensity of mineralization appears proportional to the relative development of fractures. A statistical study of fractures in the quartz porphyry shows two shear directions, a dominant direction striking 125 degrees, dipping 55 degrees northeast, and a weaker system striking 160 degrees, dipping 50 degrees northeast. Cross-joints and tension fractures commonly strike about 030 degrees and dip 65 degrees northwest and 101 degrees and dip steeply (*see* Fig. 66).

Assay results from a detailed survey of the trenches show an average of 0.23 per cent copper on 11 composite chip samples collected over a total length of approximately 750 feet. The broadest exposed area of fair to good mineralization is centred about 800 feet north of the City of Paris portal covering parts of C and D trenches. Smaller areas are found in trenches E and F and at the intersection of trench AE and a road cut 500 feet south of the Lincoln portal. Also a zone of fair mineralization occurs near the base of AB trench. This is thought to be an extension of a shallow easterly dipping zone intersected in the City of Paris crosscut about 200 feet from the portal.

The assay results reported by Lexington Mines Ltd. for 20 diamond-drill holes in the City of Paris area are plotted on Figure 67. As might be expected, copper grades are generally higher in the fresh core compared to the leached mineralized zones exposed at surface. The average reported copper grade is 0.52 per cent for an average mineralized intersection of 87 feet. In the extremes, intersections in the order of 150 to 300 feet grade from slightly less than 0.2 to more than 0.5 per cent copper, whereas seams of almost pure chalcopyrite 1 to 2 feet wide found in some of the core probably grade between 20 and 25 per cent copper.

Mineralized serpentine shear zones—High copper values have been detected locally in the serpentine adjacent to the quartz porphyry intrusion. For example, the serpentine body exposed immediately west of the Lexington portal in Goosmus Creek contains pyrite and chalcopyrite impregnations in shears. Assays on four samples taken across a 100-foot width show a range from 0.36 to 0.76 per cent cop-

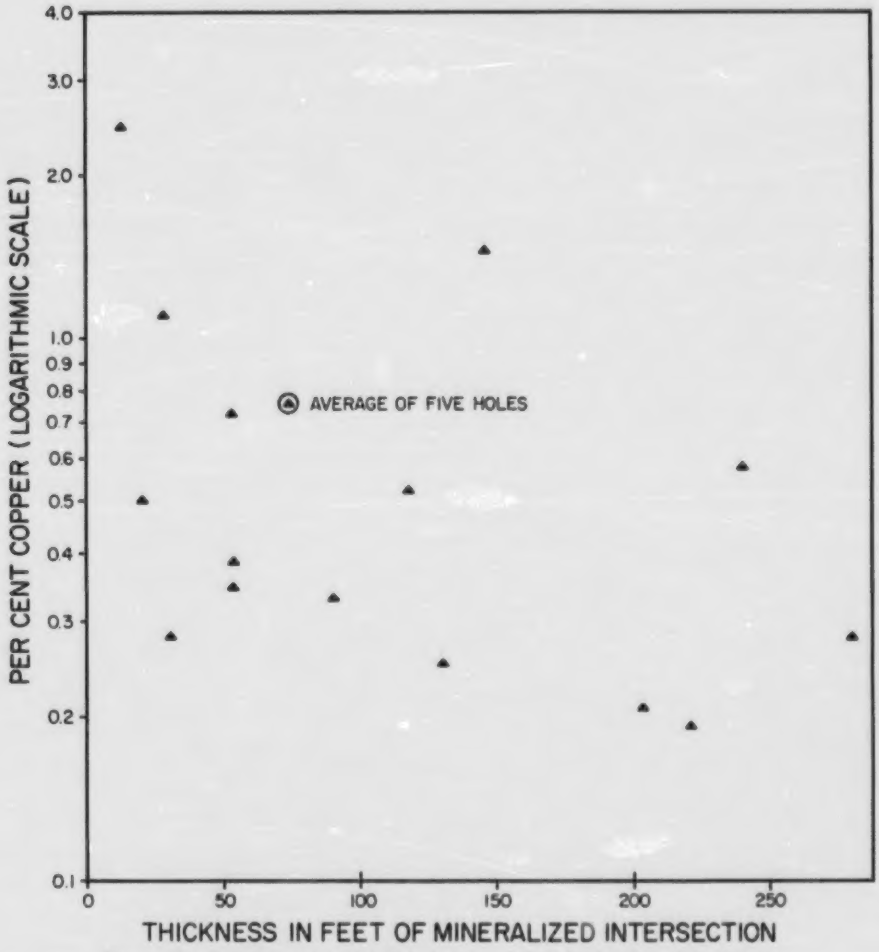


Figure 67. Copper grades of drill-hole intersections in the City of Paris area.

per. Two samples of the adjacent quartz porphyry averaged only 0.05 per cent copper.

A similar type of occurrence was discovered near the centre of the Golden Cache claim in the Mabel area (*see* Fig. 64). Grab samples of serpentine from the dumps of two old pits near an access road assayed 0.39 and 3.46 per cent copper.

The silt and soil geochemistry of Goosmus Creek—The results of a detailed copper-silver geochemical survey of silts and soils along Goosmus Creek are plotted on Figure 68. A total of 31 samples was collected, mostly at 200-foot intervals, from a point just north of the International Boundary to the headwaters of Goosmus Creek. Analyses were performed for both acid extractable and nonextractable copper and total silver, using atomic absorption methods.*

The determinations show a marked variation for total copper in silts above what is considered to be background, about 150 p.p.m. (Only a very small part of total copper proved to be nonextractable—an average of 17 p.p.m. and a range from

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* Analyses by S. Metcalfe, British Columbia Department of Mines and Petroleum Resources.

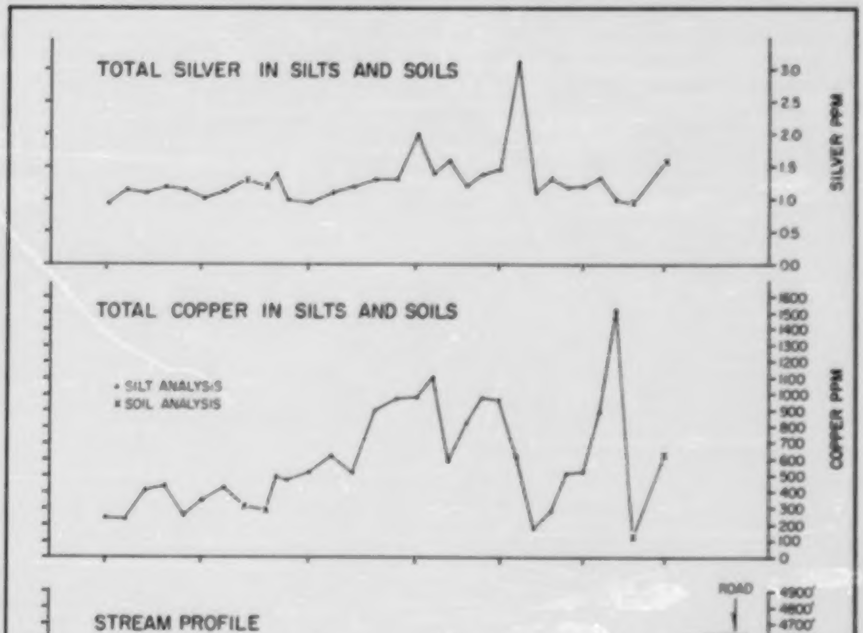

Figure 68. The distribution of copper and silver in silts and soils along Goosmus Creek.

7 to 40 p.p.m.) Three distinctive geochemical buildups are recognized; these culminate in extreme highs of 1,104 p.p.m., 971 p.p.m., and 1,516 p.p.m. at approximately 4,200, 5,000, and 6,300 feet respectively, upstream from the International Boundary. The 1,104-p.p.m. high is coincident with known copper mineralization near the Lexington portal; however, the sources of the other high values are unknown.

In the case of silver, the local background for silts is about 1 p.p.m. and modest anomalies of 2 p.p.m. and 3.1 p.p.m. are found at 4,000 and 5,200 feet respectively, upstream from the Boundary. These are roughly coincident with two of the copper highs.

Only a few soils were tested, such that the significance of the results in relation to the geochemistry of the silts is not established. However, the copper and silver concentration in a soil sample collected about 500 feet north of the headwaters of Goosmus Creek appears to be especially high, even taking into consideration an abnormally high geochemical background. This may indicate an additional geochemical anomaly, the result of another mineralized zone, or simply the extension of the copper anomaly detected in the silts at the headwaters of Goosmus Creek.

Speculation on the age and source of mineralization—Most of the mineralization in the McCarren Creek, Goosmus Creek area is thought to be the result of two episodes of igneous intrusion. These are the Early Mesozoic(?) quartz porphyry and the Early Tertiary diorite.

The quartz porphyry in the City of Paris area is evidently an automineralized* body. The main characteristics of the deposit, consisting of a pyrite-rich selvage phase and pyrite and chalcopyrite disseminations on fractures, are believed to be consequent of cooling, crystallization, and volatile mobilization in a sulphide-charged acid magma. The important pyrite and chalcopyrite disseminations were probably introduced into the chill-shattered roof of the quartz porphyry by solutions rising from a magma core; the pyrite-rich selvage probably formed by metasomatic processes induced by a strong geothermal gradient at the intrusive contacts.

The Early Tertiary diorite is widely distributed throughout Central Camp and appears to be responsible for a diverse assortment of mineral deposits such as the cupriferous skarns and carbonate showings on the Ruby claim, the pyrite-chalcopyrite impregnated serpentine schists near the Lexington portal, and pyrite-pyrrhotite replacements and silicified zones of the Mabel area. In each case the diorite is in contact or near the mineralization. Additional factors believed to be responsible for the type of mineralization include the composition and structure of the host rock. It seems possible that the diorite acted simply as a heat cell, mobilizing juvenile and cognate mineral-bearing solutions to favourable points of deposition.

It is also speculated that the main veins in the City of Paris area and at No. 7 mine are connected to nearby diorite intrusions by plumbing systems developed close to the contact of the large serpentine body traversing these areas. Evidence previously outlined suggests that these veins are probably Early Tertiary—about the same age as the diorite.

WORK DONE: Detailed geological mapping of the Mabel and City of Paris areas on the scale of 1 inch to 300 feet; geochemical survey including 4 line-miles of soil- and silt-sampling; extensive chip- and channel-sampling of surface and underground workings; 2 miles of access road construction; 13 B.Q. diamond-drill holes totalling 6,590 feet; rehabilitation of the Lexington adit on Goosmus Creek.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1892, p. 544; 1897, pp. 583, 585; 1898, pp. 1125, 1126; 1899, pp. 753, 754; 1922, p. 177; 1937, p. D31; 1938, p. D37; 1962, p. 69; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, pp. 308, 309; Daly, R. A., *Geol. Surv., Canada,* Mem. 38, Pt. I, 1912, pp. 383–388; Daly, R. A., Igneous Rocks and the Depths of the Earth, *McGraw-Hill, New York*, 1933, pp. 9–28; Little, H. W. and Thorpe, R. I., *Geol. Surv., Canada*, Paper 65-1, 1965, pp. 56–60; McNaughton, D. A., *Geol. Surv., Canada*, Paper 45-20, 1945, pp. 18–20; Mathews, W. H., *Geol. Soc. Amer.*, Bull., Vol. 75, No. 5, 1964, pp. 465–468; Monger, J. W. H., *Geol. Surv., Canada*, 1968, Paper 67-42; Parker, Raymond L. and Calkins, James A., *U.S.G.S.*, Bull. 1169, 1964; Assessment Reports 707A, B, C, 805, and 1175.

RICHMOND (No. 46, Fig. H)

By B. N. Church

LOCATION: Lat. 49°00′ Long. 118°36.2′ (82E/2E)

Seven miles southeast of Greenwood, adjacent to the Washington State Border.

CLAIMS: A total of 18 claims, including two Crown-grants (RICHMOND Fraction, NEW ST. MAURICE), two mineral leases, and 14 located claims.

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* Mineralization of a newly crystallized igneous rock by its own aqueous residuum by either fracture-filling or metasomatic processes.

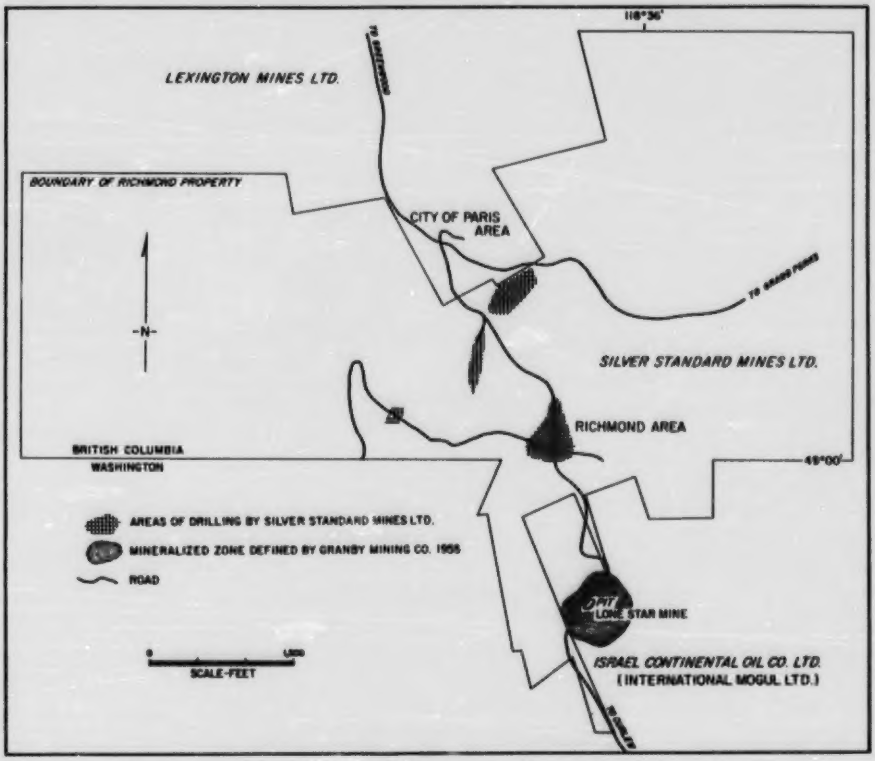
118°36'
LEXINGTON MINES LTD.
TO GREENWOOD
BOUNDARY OF RICHMOND PROPERTY
CITY OF PARIS AREA
TO GRAND FORKS
-N-
SILVER STANDARD MINES LTD.
RICHMOND AREA
BRITISH COLUMBIA
WASHINGTON
49°00'
AREAS OF DRILLING BY SILVER STANDARD MINES LTD.
MINERALIZED ZONE DEFINED BY GRANBY MINING CO. 1955
ROAD
PIT
LONE STAR MINE
0
1,000
SCALE-FEET
ISRAEL CONTINENTAL OIL CO. LTD.
(INTERNATIONAL MOGUL LTD.)
TO CURLEW

Figure 69. Location of the Richmond property and Lone Star mine.

Access: Ten miles from Greenwood via Highway 3 and the McCarren Creek gravel road.

Owners: R. H. Seraphim and Silver Standard Mines Limited.

Operators: SILVER STANDARD MINES LIMITED, 808, 602 West Hastings Street, Vancouver 2, and KENOGAMISIS GOLD MINES LTD., 612, 85 Richmond Street West, Toronto, Ont.

Metal: Copper.

Description:

Introduction

The Richmond property straddles the International Boundary adjoining and in part surrounding key claims of the Lone Star mine in Washington State (*see* Fig. 69). This report outlines the geology and mineralization on the Richmond property and reviews the history of the Lone Star mine.

History

Mineralization in the Lone Star area was first actively explored and developed in the period 1897 to 1918. In 1910 the British Columbia Copper Company gained control of the property and constructed a 5½-mile-long aerial tramway to the company smelter at Boundary Falls south of Greenwood. According to the British Columbia Minister of Mines Annual Report for 1915, page 199, the ore reserve was estimated at 170,000 tons, averaging 1.6 per cent copper. Ore shipped at this time averaged 0.032 ounce per ton gold, 0.193 ounce per ton silver, and 2.6 per cent copper. The mining operation ceased in 1918 owing to declining copper prices and remained dormant until 1953 when the present owners, Attwood Copper Mines Ltd., initiated a programme of extensive underground and surface drilling. The Granby Mining Company Limited leased the property from 1955 to 1956, during which time drilling peripheral to the old mine workings reportedly proved a 600,000-ton zone grading 1 per cent copper. Recently the property was optioned by Israel Continental Oil Company, with financial backing provided by International Mogul Limited. In late 1970 the first of a planned series of diamond-drill holes reportedly intersected 61 feet, grading 2.4 per cent copper.

Geology

The geology of the Richmond property is known only from scattered exposures and drill holes, the area being extensively covered by glacial drift (*see* Fig. 62). The central part of the property is divided by two large southeasterly trending Cretaceous(?) dyke-like serpentine bodies. These dykes are near an important structural discontinuity separating a broad area to the west underlain by Early Mesozoic or Late Paleozoic phyllitic argillite beds and an area to the east underlain by an older metamorphic complex of mainly siliceous gneiss. The narrow zone between the serpentine dykes consists of a foliated, northeasterly dipping quartz porphyry intrusion, thought to be Early Mesozoic, and remnants of older dacitic volcanic rocks. Tertiary biotite diorite intrusions are the youngest rocks and occur throughout the property.

A detailed magnetic contour map of the property prepared by Silver Standard Mines Limited delineates the serpentine intrusions. Also, two northeasterly trending faults are tentatively identified from discontinuities found in the magnetic contours. One fault is projected through the area immediately north of the Lone Star mine and a subparallel fault is plotted a few thousand feet farther north. These faults are believed to be splays of the Bacon Creek fault which has been traced to the south forming the western boundary of the Republic graben in the Curlew-Republic area of Washington State.

Mineralization

Drilling on the Richmond property has continued sporadically since 1967. The areas of intensive exploration are along the International Boundary and immediately southeast of the Lexington ground between the serpentine intrusions (*see* Fig. 69). Drilling near the International Boundary has penetrated andesitic volcanics and serpentine. According to company reports, a 40-foot section cut in a 1967 hole assayed 0.82 per cent copper; also good copper grades over narrow widths were intercepted in other holes. Recently a programme of percussion drilling southeast of the Lexington ground revealed a broad zone of mineralized quartz porphyry similar to the host rocks of the Lone Star deposit.

WORK DONE: Three line-miles of magnetometer survey on Richmond Fraction and New St. Maurice and 17 percussion drill holes totalling 4,022 feet.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 228.

WENDY (No. 121, Fig. H)

LOCATION: Lat. 49°05′ Long. 118°35.5′ (82E/2E)
One mile south of Phoenix.

CLAIMS: WENDY, VAL, HARTFORD, and others.

Access: Bush road from Phoenix.
Owner: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.
Work done: Induced polarization survey.
Reference: Assessment Report 2770.

COY (No. 122, Fig. H)

Location: Lat. 49°06.1′ Long. 118°37′ (82E/2E)
One mile west of Phoenix.
Claims: COY.
Access: By road from Phoenix.
Owner: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.
Work done: Induced polarization survey.
Reference: Assessment Report 2770.

PHOENIX MINE (No. 144, Fig. H)

By P. E. Olson

Location: Lat. 49°05.8′ Long. 118°35.9′ (82E/2E)
About 3½ miles east of Greenwood, covering the old townsite of Phoenix.
Claims: There are about 230 recorded and Crown-granted claims held by the company. Main workings are on the OLD IRONSIDES Crown grant (Lot 589).
Access: Goods roads provide access from Greenwood and from the Grand Forks–Greenwood highway.
Owner: THE GRANBY MINING COMPANY LIMITED, Phoenix Copper Division, Box 490, Grand Forks.
Metals: Copper, gold, silver (*see* Table 1 for production).
Description: The Phoenix open-pit mine overlies the old Phoenix underground operation and is largely a salvage operation where pillars, caved stopes, and some undisturbed ore are extracted. During mining operations, considerable amounts of wood and metal are removed from the old workings and occasional open stopes are intersected. Ore outlines for the open pit were established from diamond-drill holes and old maps, and these outlines have remained relatively unchanged during recent years.
Work done: Open-pit mining was limited to the main Ironsides ore zone where the pit is rapidly approaching the bottom of known ore. The mill operated continuously during the year at a rate of 2,500 tons per day. Marginal ore was stockpiled near the mill.
Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 305.

STAN, ROCKLAND (No. 15, Fig. H)

Location: Lat. 49°07′ Long. 118°34′ (82E/2E)
One mile southwest of Eholt.
Claims: Forty-nine, including the STAN, ARBUR, and KR recorded claims and the ROCKLAND and JUMBO Crown-granted claims.
Access: From Highway 3 by logging-road, three-quarters of a mile.
Owner: King Resources Company.
Operator: JASON EXPLORERS LTD, 775, 555 Burrard Street, Vancouver 1.
Metal: Copper.
Work done: Surface diamond drilling, seven holes totalling 511 feet on the Stan claims.
Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 306.

J (No. 32, Fig. H)

By B. N. Church

Location: Lat. 49°09′ Long. 118°49′ (82E/2W)
Near the headwaters of Wallace Creek, 7 miles northwest of Greenwood.

Claims: J 37 to 90, 111 to 142.

Access: Eleven miles from Greenwood via the Wallace Creek logging-road.

Owner: J. Forshaw.

Operator: OREQUEST EXPLORATION SYNDICATE, 711, 850 West Hastings Street, Vancouver 1.

Metals: Silver, copper, zinc.

Description:

Mineralization was recently discovered in a logging area located about one-half mile south of Wallace Creek at an elevation of 4,500 feet. The showing consists of two sulphide lenses about 20 feet long at the contact of actinolitic sharpstone conglomerate and an argillaceous unit. The assay of a well-mineralized grab sample showed 0.02 ounce per ton gold, 1.3 ounces per ton silver, 0.14 per cent copper, 0.08 per cent lead, 5 per cent zinc, 0.06 per cent cadmium, 0.011 per cent bismuth, 0.011 per cent arsenic, and 21.05 per cent iron.

A second showing on the property located about 1 mile west of the above-described discovery is a chalcopyrite-bearing silicified zone exposed in an old shaft near the crest of the main ridge. A grab sample assayed 0.3 ounce per ton silver, 0.7 per cent copper, 0.003 per cent lead, 0.03 per cent zinc, and 0.11 per cent arsenic.

Work done: Trenching and a reconnaissance geochemical survey.

POPPY (No. 49, Fig. H)

Location: Lat. 49°07.4′ Long. 118°46.1′ (82E/2W)
Headwaters of Motherlode Creek, about 4,000 feet elevation, 4½ miles northwest of Greenwood.

Claims: POPPY 1 to 11.

Access: By road from Greenwood.

Owner: PECHINEY DEVELOPMENT LIMITED, 619, 744 West Hastings Street, Vancouver 1.

Metal: Copper.

Description: Chalcopyrite, bornite, and chalcocite in fractures in limestone.

Work done: Geological, ground magnetometer, and geochemical soil surveys of all claims.

Reference: Assessment Report 2453.

GREYHOUND, MOTHER LODE (No. 1, Fig. H)

By P. E. Olson

Location: Lat. 49°06.4′ Long. 118°42.5′ (82E/2E)
At 3,000 to 3,400 feet elevation, approximately 2 miles west of Greenwood.

Claims: Forty-nine claims and fractions, including MOTHER LODE (Lot 704), GREYHOUND (Lot 1014).

Access: By road from Greenwood along Deadwood Creek, 3 miles.

Owner: GREYHOUND MINES LTD., 407, 570 Eighth Avenue SW., Calgary 2, Alta.; mine office, Greenwood.

Metal: Copper (*see* Table 1 for production).

Description: Metamorphosed limy sedimentary rock altered to skarn with extensive pyrite and chalcopyrite mineralization. Mother Lode deposit contains magnetite and chalcopyrite.

Work done: Surface geological mapping, 1 inch equals 400 feet; induced polarization survey, 32 line-miles; magnetometer survey, 32 line-miles; percussion drilling, 100 holes totalling 15,000 feet on all claims. The Greyhound pit was stripped early in 1970 to expose ore located by previous diamond drilling and underground workings, the latter being quite old. The company has calculated ore reserves of about 700,000 tons, grading about 0.8 per cent copper. Mill construction near the Mother Lode mine, started in 1968, was completed in 1970. The millsite was originally occupied by the Woodgreen mill. Milling commenced in September at around 1,500 tons per day, with ore being provided from the Greyhound pit.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 307.

CM (No. 47, Fig. H)

Location: Lat. 49°11′ Long. 118°43′ (82E/2E)
On Wallace Creek, 4 miles northwest of Greenwood.

Claims: CM 1 to 18.

Access: By road from Greenwood.

Operator: BOUNDARY EXPLORATION LIMITED, 148 Tenth Street SE., Grand Forks.

Metal: Copper.

Work done: EM-16 electromagnetic survey on CM 3 and 5 claims.

Reference: Assessment Report 2266.

COMBINATION (No. 143, Fig. H)

By P. E. Olson

Location: Lat. 49°07.3′ Long. 118°40.1′ (82E/2E)
Adjacent to the Greenwood–Grand Forks highway, on the north side, one-quarter of a mile east of the Jewel Lake turnoff.

Claim: COMBINATION Crown-granted claim (Lot 1458).

Access: Via a short mining-road from the Greenwood–Grand Forks highway.

Owner: E. D. CAMPBELL, Greenwood.

Metals: Silver, lead.

Work done: The present owner has rehabilitated the mining-road and shop-building and installed some machinery.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 305.

ORO DENORO (No. 145, Fig. H)

By P. E. Olson

Location: Lat. 49°07.6′ Long. 118°32.9′ (82E/2E)
The property lies immediately west of the Grand Forks–Greenwood highway, about 1½ miles north of the Phoenix turnoff.

Claims: ORO DENORO (Lot 692), EMMA (Lot 591), and 32 other adjoining Crown-granted and recorded mineral claims.

Access: By mining-roads and old railway grades from the Grand Forks–Greenwood highway.

Owner: WEST COAST RESOURCES LTD., 104, 569 Howe Street, Vancouver 1.

Metal: Copper.

Description: Known copper-bearing zones are adjacent to workings and stopes dating back to the era when smelters were working at Greenwood and Grand Forks. During the last several years, much diamond drilling and some underground work have delineated about 1,000,000 tons of material grading under 1 per cent copper. Copper mineralization has also been intersected in deep diamond-drill holes below a diorite sill.

WORK DONE: Some diamond drilling was done during 1970 on the Emma Crown grant, but results of the drilling are unknown. Mill installation was considered again during the year, but no final decision as to construction was made.

REFERENCE: *B.C. Dept. of Mines & Pet. Res., G.*E.M., 1969, p. 306.

PR, TOKYO (No. 111, Fig. H)

LOCATION: Lat. 49°08.5′ Long. 118°30.6′ (82E/2E)
One-half to 1½ miles east of Wilgress Lake, about 8 miles northwest of Grand Forks.

CLAIMS: PR, TOKYO.

ACCESS: By rough road from Highway 3, near Eholt.

OPERATOR: BAYLAND MINES LTD. (now TEXACAL RESOURCES LTD.), 403, 717 West Pender Street, Vancouver 1.

WORK DONE: Induced polarization survey.

REFERENCES: Assessment Reports 2707, 2717.

PAC (No. 123, Fig. H)

LOCATION: Lat. 49°07′ Long. 118°31′ (82E/2E)
Two miles southeast of Wilgress Lake.

CLAIMS: PAC 46 to 48, 50 to 52.

ACCESS: Bush road from Highway 3.

OWNER: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

WORK DONE: Induced polarization survey.

REFERENCE: Assessment Report 2770.

GRAND FORKS

KV (No. 120, Fig. H)

LOCATION: Lat. 49°04′ Long. 118°30.5′ (82E/2E)
Four miles northwest of Grand Forks.

CLAIM: KV.

ACCESS: Bush road from Grand Forks.

OWNER: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

WORK DONE: Induced polarization survey.

REFERENCE: Assessment Report 2769.

NICKEL MT, V&H (No. 112, Fig. H)

LOCATION: Lat. 49°03.7′ Long. 118°30′ (82E/1W)
On Goat Mountain, 4 miles northwest of Grand Forks.

CLAIMS: NICKEL MT, V&H, H&R.

ACCESS: By road from Grand Forks.

OPERATOR: BAYLAND MINES LTD. (now TEXACAL RESOURCES LTD.), 403, 717 West Pender Street, Vancouver 1.

WORK DONE: Induced polarization survey.

REFERENCES: Assessment Reports 2708, 2718.

HOPE, WET, EAGLE (No. 124, Fig. H)

Location: Lat. 49°03′ Long. 118°32′ (82E/2E)
Astride Highway 3, about 7 miles by road west of Grand Forks.
Claims: HOPE, WET, EAGLE, ALPHA, etc.
Access: Highway 3 and bush roads.
Owner: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.
Work done: Induced polarization survey.
Reference: Assessment Report 2768.

BVPK, CV (No. 106, Fig. H)

Location: Lat. 49°03′ Long. 118°34′ (82E/2E)
At approximately 4,500 feet elevation, 6 miles northwest of Grand Forks.
Claims: BVPK 1 to 8 and 1, 2, 7, 9 Fractions; CV 1 to 18; FLORENCE TRIPOD; JOE; WINDFALL.
Access: From Grand Forks by road, 6 miles.
Operator: LA MOTA MT. INDUSTRIES LTD., Box 506, Grand Forks.
Metals: Copper, molybdenum.
Work done: Geochemical soil survey, 600 samples on CV and BVPK claims.

HAREM (No. 46, Fig. H)

Location: Lat. 49°00–01.1′ Long. 118°33.3–35.2′ (82E/2E)
At approximately 3,000 feet elevation, on Stacey Creek, 5 miles southwest of Grand Forks.
Claims: HAREM 1 to 10, 13 to 23.
Access: By Highway 3 from Grand Forks, 5 miles.
Owner: SOLOMON MINES LTD., Ninth Floor, 850 West Hastings Street, Vancouver 1.
Work done: Surface geological mapping, 1 inch equals 100 feet on Harem 15 and 16 claims; ground magnetometer survey, 2 line-miles on Harem 16 claim; electromagnetic survey, 2 line-miles on Harem 16 claim.
References: *Minister of Mines, B.C.,* Ann. Rept., 1960, p. 63 (*see* West Coast Resources Ltd.); Assessment Report 2460.

SD (No. 84, Fig. H)

By J. W. McCammon

Location: Lat. 49°07.4′ Long. 118°23.4′ (82E/1W)
At 3,850 feet elevation on the crest of the ridge between Toronto and Snowball Creeks, 2½ miles east of Granby River and 6½ miles north-northeast of Grand Forks.
Claims: SD 1 to 36 and others.
Access: By rough dirt road, 10 miles north from Highway 3 at the gravel pit one-half mile east of the bridge at Grand Forks.
Operator: BOUNDARY EXPLORATION LIMITED, 148 Tenth Street SE., Grand Forks.
Metal: Uranium.
Description:

Radio-active mineralization occurs in quartz-feldspar-mica pegmatite in Proterozoic Grand Forks paragneiss. Map 6-1957 of the Geological Survey of Canada shows these rocks distributed over an area about 24 miles long and 6 mile wide, north and east of Grand Forks.

A brief visit was made to the property in October 1970. No guide was available at the time.

Two trenches were seen. One was 90 feet long in an east-west direction and 3 feet wide. It had been opened up by blasting in bedrock. Irregular lensy patches of pegmatite interlayered with other members of the gneissic complex were exposed in the trench. High readings on a geiger counter were obtained at several scattered places in the trench. These tended to be at spots in pegmatite where black mica was concentrated in clots. A few feet south of the centre of the trench a small pit had been blasted in a lens of pegmatite. Much bright-yellow stain was present in fractures in the rock and it gave high readings on the counter. About 100 feet west of the west end of the trench a second trench had been dug by bulldozer for 500 feet in a north-south direction along the bottom of a small gully at the base of the steep east side of a hill. Bedrock containing pegmatite was uncovered in two or three small exposures in the trench. Moderately high geiger counts were recorded in two of these exposures.

About a mile south of the trenches, a small bluff of pegmatite outcrops between the road and Snowball Creek. No exceptionally high counts on the geiger counter were obtained at this showing.

Small pin-head-sized glossy black grains identified as uraninite were found in mica patches that gave high geiger counts. Uranophane was identified in scrapings of the secondary materials that coat rock fractures.

CHRISTINA LAKE

MASTODON (No. 104, Fig. H)

LOCATION: Lat. 49°00.5′ Long. 118°10.3′ (82E/1E)
On Castle Mountain, about 2 miles southeast of Cascade.

CLAIMS: MASTODON (Lot 2384) and other Crown-granted and located claims.

ACCESS: From Cascade by gravel road, 3 miles.

OWNER: Hunter Point Explorations Ltd.

OPERATOR: CHROMEX NICKEL MINES LTD., 826, 470 Granville Street, Vancouver 2.

METALS: Nickel, chromium.

DESCRIPTION: Ultrabasic rocks with nickel sulphide.

WORK DONE: Road construction, 2 miles to provide access to drill stations; surface diamond drilling, 12 holes totalling 5,100 feet.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 311.

FFC (No. 50, Fig. H)

LOCATION: Lat. 49°03.1–06.5′ Long. 118°09.3–12.6′ (82E/1E)
Along east side of Christina Lake, at and northeast of Fife, between 1,460 and 4,300 feet elevation.

CLAIMS: FFC 1 to 106, Lot 120s (PRIZE No. 2), Lot 121s (MESSENGER), Lot 1036 (CANNONBALL), 109 claims in all.

ACCESS: By road from Fife.

OWNER: BOUNDARY EXPLORATION LIMITED, 148 Tenth Street SE., Grand Forks.

METAL: Copper.

WORK DONE: Geological, ground magnetometer, and geochemical soil and stream sediment surveys.

REFERENCE: Assessment Report 2371.

BURRELL CREEK

KINGFISHER, PAR, DODGE (No. 105, Fig. H)

LOCATION: Lat. 49°40′ Long. 118°20′ (82E/9W)
At approximately 4,000 feet elevation, between Mount Franklin and Burrell Creek.

CLAIMS: KINGFISHER; PAR; DODGE; MM 2, 6, 8.

ACCESS: From Grand Forks by road, 45 miles.

OPERATOR: LA MOTA MT. INDUSTRIES LTD., Box 506, Grand Forks.

METALS: Copper, silver, lead, zinc, cadmium, platinum, palladium.

DESCRIPTION: Quartz vein and disseminated ore in pyroxenite.

WORK DONE: Surface and underground workings mapped; underground geological mapping, 1 inch equal 10 feet on MM 4 and 8 and Par; geochemical soil survey, 100 samples covering Par and Dodge; trenching, 100 feet on Par; underground work, 10 feet on Par.

LOIN (No. 85, Fig. H)

LOCATION: Lat. 49°36.1–38.1′ Long. 188°19.8–22.2′ (82E/9W)
At approximately 4,500 feet elevation, at the headwaters of Pinto Creek, a tributary of Gloucester Creek.

CLAIMS: LOIN 1 to 58.

ACCESS: By road from Grand Forks, 40 miles.

OPERATOR: WEST COAST MINING & EXPLORATION, 205, 122 East 14th Street, North Vancouver.

METAL: Copper.

DESCRIPTION: Chalcopyrite in intrusive rock, probably related to shear zones, etc.

WORK DONE: Electromagnetic survey totalling 25 line-miles and a geochemical soil survey consisting of 1,200 samples on the Loin 1 to 6, 11 to 14, 31, 33, 40, 42, 44, 49, 51, and 57 claims.

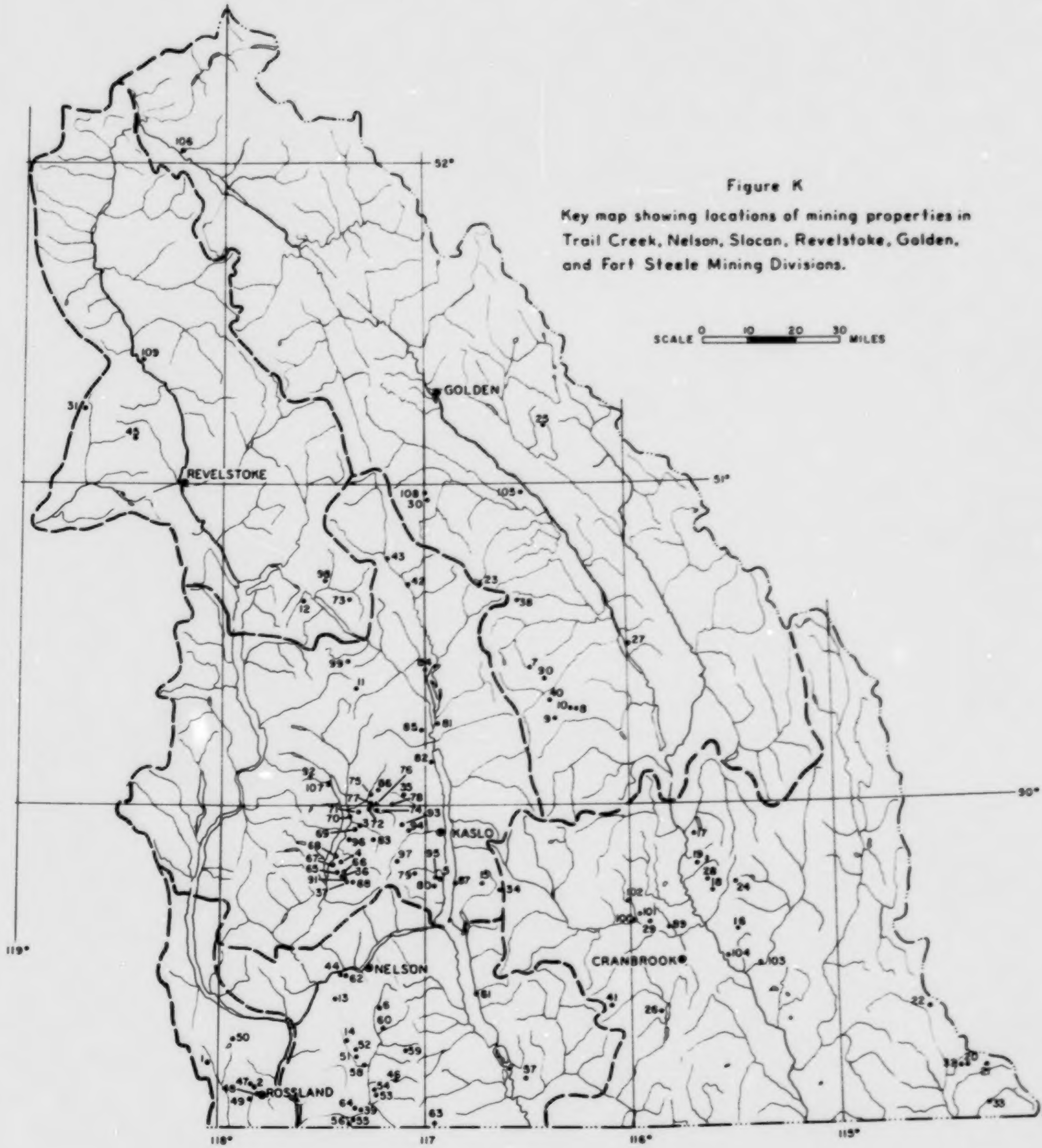
GOLDEN
REVELSTOKE
KASLO
NELSON
CRANBROOK
ROSSLAND
52°
51°
50°
49°
119°
118°
117°
116°
115°
SCALE 0 10 20 30 MILES

Figure K

Key map showing locations of mining properties in Trail Creek, Nelson, Slocan, Revelstoke, Golden, and Fort Steele Mining Divisions.

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12 LB (LUCKY BOY), page 465.
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17 PRE, page 471.
18 KOOTENAY KING, page 472.
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TRAIL CREEK MINING DIVISION

SHEEP CREEK

ENTERPRISE (No. 1, Fig. K)

Location: Lat. 49°12–13′ Long. 118°02–03′ (82E/1E)
At approximately 4,500 feet elevation, 10 miles northwest of Rossland.

Claims: Twenty-nine, including ENTERPRISE (Lot 14563), HUCKLEBERRY (Lot 14564), EUREKA (Lot 14565), KING PETER (Lot 14566), LUCKY PETER (Lot 14567), CORBIN (Lot 14569), NORWAY STAR (Lot 14570) Crown-granted claims, and surrounding claims held by record called DIXIE A to O and DIXIE Fraction.

Access: By logging-trails from Highway 3, 2½ miles.

Operator: PLACID OIL COMPANY, 860 Guiness House, Calgary 2, Alta.

Metals: Lead, zinc, copper, silver, molybdenum.

Work done: Surface geological mapping, 1 inch equals 200 feet; magnetometer survey, 21 line-miles; turam survey, 11.3 line-miles; geochemical soil survey, 1,000 samples; surface diamond drilling, five holes totalling 1,462 feet on Corbin, Enterprise, and Dixie N.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1936, p. E 24.

PS (No. 50, Fig. K)

By P. E. Olson

Location: Lat. 49°16.7′ Long. 117°55′ (82F/5W)
On the Christina Lake–Kinnaird highway, about 1 mile northeast of the Rossland turnoff.

Claims: The PS No. 1, MOONGLOW, and about 20 other recorded claims.

Access: Principal showings are on, or just north, of the highway.

Owner: W. W. SCHWARTZENHAUER, Castlegar.

Metal: Tungsten.

Description: Scheelite mineralization has been exposed in a rock cut on the main highway, and several places northwest of the highway. The host rock is skarn, which is exposed intermittently in the area. Skarn development is associated with numerous dykes and diorite intrusions of the area.

Work done: Stripping, prospecting, and sampling were done on the PS No. 1 and Moonglow claims.

ROSSLAND

COXEY MINE (No. 47, Fig. K)

By P. E. Olson

Location: Lat. 49°05.3′ Long. 117°49.6′ (82F/4W)
On the west slope of Red Mountain, about 2 miles west of Rossland.

Claims: Eighteen mineral claims and two mineral leases. The principal claim is the COXEY Crown-granted claim (Lot 1221).

Access: Via a good road which leaves the Cascade highway about 1 mile west of Rossland.

Owner: RED MOUNTAIN MINES LIMITED, Box 849, Rossland.

Metal: Molybdenum (*see* Table 1 for production).

Work done: For the last several years, the company has been mining continuously from surface ore zones mainly on the Coxey Crown grant. Only a small amount of waste had to be removed to enable mining of the zones of mineralization. Mill capacity had been stepped up to around 750 tons per day. Mining and milling were continuous until December, when operations shut down due to lack of ore. Other mineralized zones are known but, according to the company, there was insufficient stripping done to permit the mining of ore by the time other zones were exhausted.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 314.

NOVELTY (No. 2, Fig. K)

Location: Lat. 49°05′ Long. 117°50′ (82F/4W)
At approximately 4,500 feet elevation on Red Mountain.
Claims: Thirteen Crown-granted claims, including NOVELTY (Lot 958).
Access: By road from Rossland, 1½ miles.
Owner: Cascade Molydenum Mines Ltd.
Operator: RED MOUNTAIN MINES LIMITED, Box 849, Rossland.
Metal: Molybdenum.
Work done: Surface workings mapped; trenching, 6,940 tons.
Reference: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 239.

LE ROI, NICKEL PLATE (No. 48, Fig. K)

By P. E. Olson

Location: Lat. 49°05′ Long. 117°48.5′ (82F/4W)
The company holdings straddle the city of Rossland.

Claims: The company owns about 70 Crown-granted and recorded mineral claims, including the LE ROI (Lot 240), WAR EAGLE (Lot 690), the NICKEL PLATE (Lot 637).

Access: Rossland streets provide access to the company's workings.

Owner: FALAISE LAKE MINES LTD., 625, 925 West Georgia Street, Vancouver 1; mine office, 2128 Columbia Avenue, Rossland.

Metals: Gold, silver, copper.

Work done: The old workings of the Le Roi, Centre Star, and other mines are embraced by the company holdings. In and around these old workings there are remnants of veins which carry significant copper and gold values. The present company proposes to explore the old workings to assess the economic worth of the deposits. About 2,500 feet of drifting was done on the 3050 level, and the old Le Roi workings were intersected on the Le Roi No. 8 level. The water in the Le Roi workings was carefully drained prior to effecting a break-through, since a sudden rush of water from the old workings would have affected Trail. Diamond drilling consisting of 22 holes totalling 2,031 feet was done after the old workings had been entered. The adit was geologically mapped for 4,000 feet.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 314.

MIDNIGHT (No. 49, Fig. K)

By P. E. Olson

Location: Lat. 49°04.5′ Long. 117°50′ (82F/4W)
Two miles west of Rossland.

Claims: The MIDNIGHT Crown-granted mineral claim (Lot 1186) and 12 adjoining recorded mineral claims.

Access: Via 1½ miles of good road which leaves the Cascade highway one-half mile from the Rossland junction.

Owner: Tull Mines Ltd.

Operator: FEDERATED MINING CORPORATION LTD., 1322, 510 West Hastings Street, Vancouver 2.

Metal: Gold.

Description: Gold occurs in the Midnight mine in narrow, discontinuous quartz veins in serpentine.

Work done:

The Midnight mine has produced a small amount of high-grade gold shipping ore during its history Recent operators have endeavoured to delineate sufficient ore to justify a small mill. A 100-tons-per-day mill was brought to the property in 1968 and was erected mainly in 1969 and completed late in 1970. Some stope preparation and stoping were done to supply the newly erected mill with sufficient ore for recovery tests. No results from the gravity-type mill were available by the end of 1970.

The mill consisted of the following equipment:

Crusher—40-horsepower motor.
Screen—5-horsepower motor.
Ball mill—50-horsepower motor.
Classifiers—two 3-horsepower motors.
Jigs—5-horsepower motor.
Shaker tables—two 3-horsepower motors.
Sump pump—3-horsepower motor.
Blower—5-horsepower motor.
Crusher conveyor—7.5-horsepower motor.
Crusher return conveyor—5-horsepower motor.
Assay crusher—2-horsepower motor.
Assay pulverizer—3-horsepower motor.

The West Kootenay Power and Light Company installed a substation to supply power.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 314.

NELSON MINING DIVISION

NELSON

REX (No. 44, Fig. K)

Location: Lat. 49°28′ Long. 117°25′ (82F/6W)

At approximately 2,000 feet elevation, near Blewett.

Claims: REX 1 to 6.

Access: From Nelson by road, 6 miles.

Operator: THE GRANBY MINING COMPANY LIMITED, 507, 1111 West Georgia Street, Vancouver 5.

Metal: Copper.

Description: Chalcopyrite in an aplite dyke in Nelson hornblende granodiorite.

Work done: Magnetometer survey, 5 line-miles and geochemical soil survey, 350 samples covering Rex 1 to 6; trenching, 160 feet on Rex 1, 5, and 6.

GRANITE POORMAN (No. 62, Fig. K)

By P. E. Olson

Location: Lat. 49°28.3′ Long. 117°23.1′ (82F/6W)

On Eagle Creek, immediately above the Nelson–Blewett highway.

Claims: POORMAN (Lot 101), HARDSCRABBLE (Lot 102), GRANITE (Lot 2550) Crown-grants.

Access: Via the Blewet highway from Nelson, a distance of about 6 miles.

Owner: H. R. Smith, Blewett.

Operator: INTERNATIONAL KENVILLE GOLD MINES LTD., c/o Tony Semeniuk, Nelson.

Metal: Gold.

Description: The Granite Poorman mine, formerly operated by Kenville Gold Mines Ltd., was a major gold producer until about 1949, after which time production was limited to leasing. The current operators expected to find ore reserves in the mine, not knowing that stoping by the old company and leasers had removed all known ore from the workings.

Work done: The main level above the Kenville mill was cleared out and drained, providing access and ventilation to most of the mine. No underground work was carried out.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1954, p. 123.

ROVER CREEK

WHITEWATER (No. 13, Fig. K)

Location: Lat. 49°23′ Long. 117°26′ (82F/6W)
At approximately 7,500 feet elevation, near Siwash Mountain on Rover Creek.

Claims: Twenty-three claims, including the Crown-granted claims WHITEWATER (Lot 529), SNOW WATER (Lot 3137), STILLWATER (Lot 3811), COLUMBIA (Lot 3136), MIDAS (Lot 3135), and recorded claims TERRY, BEAR.

Access: By four-wheel-drive vehicle from Nelson, 17 miles.

Operator: SCURRY-RAINBOW OIL LIMITED, 539 Eighth Avenue SW., Calgary 2, Alta.

Metal: Gold.

Description: Gold-bearing pyrite in quartz veins in diorite.

Work done: Surface geological mapping, 1 inch equals 400 feet on Columbia and Whitewater; underground geological mapping, 1 inch equals 20 feet on Whitewater; road construction, one-half mile on Columbia and Whitewater; trenching, 2,500 feet on Columbia, Whitewater, and Stillwater; surface diamond drilling, three holes totalling 1,064 feet on Whitewater.

Reference: *B.C. Dept. of Mines*, Bull. 1, 1932, p. 101.

YMIR

EUPHRATES (No. 6, Fig. K)

Location: Lat. 49°23.1′ Long. 117°12.5′ (82F/6E)
At approximately 3,200 feet elevation, 9 miles south of Nelson on southeast side of road.

Claims: A 1 to 8 (covering old Euphrates property); PIA 1 to 10 (covering adjoining Golden Age property).

Access: By car from Nelson, 9 miles.

Owner: ROBERT MINES LTD., 214, 475 Howe Street, Vancouver 1.

Metals: Gold, silver, lead, zinc.

Description: Northwesterly trending quartz veins in schistose volcanic rocks of the Rossland Group, near a tongue of granodiorite, have been mined intermittently.

Work done: Topography mapped; geochemical soil survey, 197 samples covering A 3 and 4 and part of A 5 and 6.

References: *Minister of Mines, B.C.*, Ann. Rept., 1937, p. E 30; Assessment Report 2598.

YMIR, GOODENOUGH (No. 60, Fig. K) By P. E. Olson

Location: Lat. 49°19.2′ Long. 117°10′ (82F/6E)
The mine is situated on the north side of Ymir (Wildhorse) Creek, 6 miles from Ymir.

Claims: The GOODENOUGH (Lot 13025) and other Crown-granted claims.

Access: By poor mining-road along Ymir Creek from Ymir, 6 miles.

Owner: SILVER DAWN MINES LTD., 203, 1033 West Pender Street, Vancouver 1.

Metal: Gold (*see* Table 1 for production).

Work done: Some adits were rehabilitated and the underground workings prospected for scheelite. A small amount of selected dump rock was shipped to the Trail smelter.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1964, p. 115.

HOWARD (No. 59, Fig. K) By P. E. Olson

Location: Lat. 49°14.2′ Long. 117°06.5′ (82F/3E)
On the east side of Active Creek, a tributary of Porcupine Creek, at elevations of 5,000 to 5,800 feet.

Claims: HOWARD (Lot 12540) and other Crown-granted claims.

Access: By poor mining-roads along Porcupine and Active Creeks, 7 miles from the Ymir–Salmo highway.

Owner: Mrs. J. Craft.

Operator: JOHN STOOCHNOFF AND PARTNERS, Salmo.

Metals: Gold, silver, lead, zinc (*see* Table 1 for production).

Work done: About 30 tons of selected dump rock was shipped to the Trail smelter.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 316.

ERIE CREEK

HATTIE (No. 14, Fig. K)

Location: Lat. 49°16′ Long. 117°22′ (82F/6W)
At approximately 3,500 feet elevation, on the east side of Erie Creek, between Burnt and Craigtown Creeks.

Claims: HATTIE 1 to 15, 29 to 32; Mineral Leases M-125, M-129.

Access: By road from Erie, 6 miles.

Owner: Wollaston Lake Mines Ltd.

Operator: McINTYRE PORCUPINE MINES LIMITED, 312, 409 Granville Street, Vancouver 2.

Description: Molybdenite in fractures in granitic rocks, porphyries, and adjacent sediments.

Work done: Surface diamond drilling, seven holes totalling 3,252 feet.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 318.

TRIXIE V (No. 52, Fig. K) By P. E. Olson

Location: Lat. 49°15′ Long. 117°19.5′ (82F/6W)
At the head of Rest Creek, a tributary of Erie Creek, from the east.

Claims: PATTY M recorded mineral claims.

Access: Via mining and logging-roads, along Erie and Rest Creeks.

Owners: CARL WILSON and LEONARD BRADLEY, Box 369, Salmo.

Metals: Gold, silica.

WORK DONE: The Trixie V Crown-granted mineral claim (Lot 3848) was prospected after the turn of the century and later it reverted to the Crown. The Patty M claims were located over the reverted Crown-grant. An old adit was advanced in 1969 with no values being encountered. The owners of the property continued to prospect the area around the old workings, but were unable to find significant values in gold. Sulphides of iron have been found, but they do not contain gold values. No throughgoing geological structures were noted on the property.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 318.

NEW ARLINGTON (No. 51, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°13.4′ Long. 117°19.6′ (82F/3W)
On Mineral Mountain, between Whisky and Rest Creeks, tributaries of Erie Creek from the east.

CLAIMS: Ten Crown-granted mineral claims, including the ARLINGTON (Lot 3648), on which the main workings are located.

ACCESS: Via the Erie Creek road, which leaves the Salmo–Trail highway immediately east of the Erie Creek bridge.

OWNER: G. D. FOX AND ASSOCIATES, 3307 Dahlia Crescent, Trail.

METALS: Gold, silica (*see* Table 1 for production).

WORK DONE: The workings in and around the New Arlington are quite old and were originally mined for gold. In recent years the mine dumps have been shipped to Trail for silica flux and the minor amount of gold left by the original operation. Some new exploration in the vicinity of the Arlington and Canadian Queen Crown-grants has proven unsuccessful. During 1970, drifting was done on the Canadian Queen following exploration done in 1969. Generally discouraging results were obtained from the exploration. Dump shipments ceased in 1970 after 1,103 tons had been sent to the Trail smelter.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 318.

SILVER DOLLAR (No. 58, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°14.6′ Long. 117°19.4′ (82F/3W)
The mine is adjacent to the Great Northern Railway, immediately west of Salmo.

CLAIMS: SILVER DOLLAR (Lot 12599), LUCKY BOY (Lot 12600) Crown-granted claims.

ACCESS: Via one-half mile of truck road which leaves the Salmo–Trail highway 1 mile west of Salmo.

OWNER: D. H. NORCROSS, Granite Road, Nelson.

METALS: Gold, silver, lead, zinc (*see* Table 1 for production).

WORK DONE: Selected portions of dumps were shipped to the Trail smelter, and some rehabilitation was done on the upper level.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 317.

SHEEP CREEK

SHEEP CREEK CAMP (No. 46, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°09′ Long. 117°09′ (82F/3E)
The Sheep Creek Camp is situated on Sheep Creek, about 5 miles from the Salmo–Nelway highway.

CLAIMS: RENO (Lot 12684), YELLOWSTONE (Lot 3651), YOSEMITE (Lot 3654), EDWARD VIII (Lot 9077), QUEEN (Lot 1076), BURLINGTON (Lot 1079), MALWAAZ (Lot 3652).

ACCESS: Via the Sheep Creek mining-road from the Salmo–Nelway highway.

OWNERS: J. A. C. ROSS, R. TJADER, and others.

METALS: Gold, silica (*see* Table 1 for production).

WORK DONE: Previous operators in the Sheep Creek Camp, mainly during the 1930's, left waste dumps containing a small amount of gold. It has been profitable to truck this to the Trail smelter due to the high silica content of the dumps. The smelter requires about 30,000 tons of silica yearly for its smelting operations and gives preferred rates for high silica ore.

REFERENCE: *Geol. Surv., Canada,* Mem. 172, p. 42.

IRON MOUNTAIN

INVINCIBLE (No. 54, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°06.8′ Long. 117°13.2′ (82F/3E)
On Iron Mountain, adjacent to the Jersey mine.

CLAIMS: The INVINCIBLE Crown-granted mineral claim (Lot 12084) and adjoining claims are part of the Jersey and Emerald mine-area.

ACCESS: Via 4 miles of good mining-road from the Salmo–Nelway highway.

OWNER: CANADIAN EXPLORATION LIMITED, 700, 1030 West Georgia Street, Vancouver 5; mine office, Salmo.

METAL: Tungsten.

WORK DONE:

Diamond-drill exploration during the late 1960's disclosed appreciable tungsten ore at depth on the Invincible claim, and late in 1968 a decision was made to develop this ore and rehabilitate the old Emerald mill. Mill construction was completed in 1970 and concentrate production started in October. By the year-end the mill was treating 430 tons per day on a trial basis. Production came from rehabilitated Dodger workings, since the Invincible ore zone had not been reached.

Other work included underground geological mapping, 1 inch equals 20 feet on the Gold Standard, Standard Fraction, Emerald, Emerald Fraction, King Alfred, and Invincible claims; road construction, three-quarters of a mile on the Emerald, Emerald Fraction, Standard Fraction, and Gold Standard claims; surface diamond drilling, one hole totalling 550 feet on the Invincible claim; underground diamond drilling, 15 holes totalling 2,600 feet on the Emerald and King Alfred claims.

The Invincible drift was advanced to 4,300 feet and a ventilation raise started to the surface. A power cable to carry 2,300 volts was installed to the 2,600-foot point and a portable 150-kva. substation was installed to feed a 40-horsepower pump and temporary fans. Two 125-horsepower ventilation fans were installed at the Invincible portal. These fans will be moved to the top of the ventilation raise when it is completed. A 300-kva. substation has been installed at the top of the vent raise to supply the fans.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 319.

JERSEY MINE (No. 53, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°05.9′ Long. 117°13.5′ (82F/3E)
On Iron Mountain, between Lost and Sheep Creeks.

CLAIMS: Fifty-six Crown-granted mineral claims.

Access: The main access road to the property leaves the Salmo–Nelway highway immediately south of the Sheep Creek bridge.

Owner: CANADIAN EXPLORATION LIMITED, 700, 1030 West Georgia Street, Vancouver 5; mine office, Salmo.

Metals: Lead, zinc (*see* Table 1 for production).

Work done: The Jersey mine operated successfully from 1949, starting with a production rate of 300 tons per day and reaching a rate of 2,500 tons per day in 1969. It was the first major mine in Canada to adopt trackless mining methods. These methods have been widely copied. During 1969 and 1970, increasing production came from pillar recovery as ore reserves were depleted. Regular production ceased in 1970 and a ball mill driven by a 300-horsepower motor and several small motors and the 460-volt motor-control centre were moved from the lead-zinc concentrator to the site of the abandoned Emerald mill near the Jersey townsite.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 319.

REMAC

PY, P (No. 39, Fig. K)

Location: Lat. 49°02.5′ Long. 117°18.5′ (82F/3W)
West bank of Salmo River, 4 miles northeast of Remac.

Claims: PY, P, totalling 38.

Access: From Salmo by road, 10 miles.

Owner: PYRAMID MINING CO. LTD., 640, 890 West Pender Street, Vancouver 1.

Metals: Lead, zinc.

Description: Quartzite, argillite, phyllite, and limestone intruded by granitic rocks, in bands striking east of north, contain disseminated pyrite and pyrrhotite.

Work done: Surface geological mapping, 1 inch equals 4,000 feet on PY and P claims; induced polarization and magnetometer survey, 14.7 line-miles covering PY and P claims; geochemical soil survey, 145 samples covering P 1, 2, and 3 claims; percussion drilling, three holes totalling 510 feet on P 1, 2, and 3 claims.

References: *B.C. Dept. of Mines*, Bull. 41, 1959, pp. 135, 147; Assessment Report 2747.

RED ROCK (No. 64, Fig. K)

By P. E. Olson

Location: Lat. 49°02.7′ Long. 117°20.8′ (82F/3W)
On the north side of Salmo River, between McCormick and Wallach Creeks, at an elevation of about 3,300 feet.

Claims: Fifteen recorded mineral claims, including the MOON BEAM group and the KATHERINE claim.

Access: Via 2 miles of fair mining-road from the Nelway–Waneta road.

Owner: FEDERATED MINING CORPORATION LTD., 1650, 777 Hornby Street, Vancouver 1.

Metals: Lead, zinc.

Work done: Drifting, raising, and diamond drilling were done on the No. 3 level of the Red Rock workings. The level was extended about 100 feet, and intersected a mineralized fracture striking about north 45 degrees east, which is apparently a downward extension of mineralization encountered in the upper workings. Massive sulphides, mainly galena and pyrite, were exposed in a lenticular mass in a fracture zone. Drifting and raising along the mineralization demonstrated the discontinuous nature of the mineralization. Surface installations included a bin, a storage shed, and several roads.

REFERENCE: *B.C. Dept. of Mines,* Bull. 41, 1959, pp. 138, 139.

REEVES MacDONALD MINE (No. 55, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°01.3′ Long. 117° 21.9′ (82F/3W)
On the north side of the Pend-d'Oreille River, 4 miles west of Nelway.

CLAIMS: About 75 recorded and Crown-granted mineral claims at Remac.

ACCESS: The mine is on the Nelway–Waneta road, 4 miles from Nelway. The Nelway–Remac section of this road was improved in 1970.

OWNER: REEVES MACDONALD MINES LIMITED, Remac.

METALS: Lead, zinc (*see* Table 1 for production).

WORK DONE: From the middle of 1970 no major blasting was done in the Reeves, but the mine continued to produce while broken ore could be salvaged from old stopes. Some diamond drilling was in progress at year-end, but no new ore was found. Production from the main Reeves ore zone continued throughout the year, but dropped to around 3,000 to 4,000 tons per month by the year-end. This production was entirely salvage from old stopes. Production is expected to terminate when the metal content drops below the break-even point. No further stoping is anticipated when broken ore in stopes is exhausted.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 320.

ANNEX (No. 56, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°00.8′ Long. 117°22.3′ (82F/3W)
Immediately south of the Pend-d'Oreille River, south of Remac.

CLAIMS: About 40 recorded and Crown-granted claims which adjoin the main Reeves MacDonald holdings along the Pend-d'Oreille River.

ACCESS: The mine is reached by a private mining-road and bridge from Remac.

OWNER: REEVES MACDONALD MINES LIMITED, Remac.

METALS: Lead, zinc (*see* Table 1 for production).

DESCRIPTION: For the last few years the company has been developing the Annex orebody, which appears to be a down-faulted section of ore related to the Reeves ore zones. This ore was intersected by several deep diamond-drill holes and, following the sinking of the Annex shaft, by underground drifts and short diamond-drill holes.

WORK DONE:

Preliminary development of the Annex mine was completed during the year and production started in April, with milling being done at the Reeves mill at Remac. Production is by Cavo sublevels, using conventional jack-legs and stopers. Ore from the Annex is of higher grade than ore from the main Reeves ore zone.

Underground geological mapping, 1 inch equals 20 feet on Annex 1 claim; underground work: 58-foot conventional three-compartment shaft; 1,456 feet of 4-foot-diameter bored raise; 4,306 feet of drifts and raises; 105,462 cubic feet of slash; underground diamond drilling, 17 holes totalling 6,059 feet, and percussion drilling, 335 holes totalling 5,033 feet on Annex 1 claim.

A Nordburg hoist was installed on the 1750 level for the Annex shaft. Two 100-horsepower pumps were installed on the 780 level. The 3,000-volt power cable was extended from 1000 level to 800 level, where a substation was built. Telephone, pump alarm, station lighting, and signal systems were installed in the shaft.

Two scraper hoists driven by a 40-horsepower and a 20-horsepower motor respectively, and one 40-horsepower vent fan were installed on 1750 level.

Five Coffing hoists and two Sasgen hoists were installed for a Cavo machine.

The 2,200-volt line was extended to service the office trailer and Annex mine dry.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 320.

PRIEST RIVER

GIANT, MIDGET (No. 63, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°00.8′ Long. 116°56′ (82F/2W)

On the west side of Priest River, about 1 mile north of the United States border.

CLAIMS: Recorded claims of the GIANT and MIDGET groups. Principal showings are on the MIDGET claim.

ACCESS: Via 9 miles of logging-road which leaves the Salmo–Creston highway at Summit Lake.

OWNER: E. C. SHUNTER, Creston.

METALS: Copper, silver.

DESCRIPTION: Galena, tetrahedrite, and pyrite are found in scattered grains and bunches in a massive quartz vein striking northerly along the west side of the Priest River.

WORK DONE: Some prospecting of the area was done, including some drilling and blasting on the main showing. The mill erected in 1968 was removed after treating very little ore. No concentrates were produced.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 246.

SANCA CREEK

LAKEVIEW (No. 61, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°22′ Long. 116°43′ (82F/7E)

The claim and underground workings are astride the Creston–Boswell highway, about 1 mile south of Sanca Creek.

CLAIM: LAKEVIEW (Lot 14227).

ACCESS: On Creston–Boswell highway.

OWNER: E. G. TIMMONS, Boswell.

METALS: Silver, lead, zinc.

WORK DONE: The mine has been idle for many years. The main level is about 80 feet below the highway, while stopes and raises surface along and immediately east of the highway, which was under improvement in 1970. Blasting and bulldozing on the highway exposed several old mine openings which were subsequently filled. The proximity of mine workings to the highway has resulted in a potentially dangerous situation. This hazard has now been eliminated and further mining in the vicinity of the highway will not be permitted.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1957, p. 47.

CRESTON

OTTO SILVER (No. 57, Fig. K) By P. E. Olson

Location: Lat. 49°07.8′ Long. 116°28.8′ (82F/1W)
On Arrow Mountain, 4 miles northeast of Creston, at an elevation of 4,200 feet above sea-level.

Claims: OTTO 1 to 4 recorded mineral claims.

Access: Via logging-road from Creston, partly over private land.

Owner: Melvin Hinkel and Associates.

Operator: SPOKANE NATIONAL MINES INC., c/o Melvin Hinkel, Salmo.

Metals: Silver, lead.

Work done: The Otto mine lies to the east of the Alice mine and is probably on the same structure as the Alice deposit. A narrow, discontinuous vein carrying scattered bunches of argentiferous galena has been exposed by old workings which were cleared out during 1969. Some ore has been shipped from the Otto. Rejects from hand-sorting have been stockpiled near the main adit. About 1 mile of poor tractor road was built by the operators during 1970.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 322.

SLOCAN MINING DIVISION

SHANNON CREEK

A (No. 92, Fig. K) By P. E. Olson

Location: Lat. 50°05.1′ Long. 117°34.8′ (82K/4E)
On the North Fork of Shannon Creek, which drains into the north end of Slocan Lake. Workings are at an elevation of 5,180 feet.

Claims: A block of recorded claims, including the A 3 and A 4 claims.

Access: Via logging-roads along Shannon Creek from Hills, a distance of 10 miles.

Owner: Alex. Strebchuck.

Operator: RIMROCK MINING CORPORATION, LIMITED, 1007 Baker Street, Cranbrook.

Metals: Silver, lead, zinc.

Work done: In 1970, several claims were relocated to correct an apparent error in the original staking by Alex. Strebchuck. Geophysical surveying and diamond drilling were done during the year. Alex. Strebchuck and Peter Leontowicz did some drifting and stoping immediately west of the North Fork on a vein striking southwesterly and dipping very steeply. Several tons of possible shipping ore was stockpiled at the portal. The vein occupies a shear in coarse-grained granite.

VICTIM, LEONA (No. 107, Fig. K)

Location: Lat. 50°03.5–04.5′ Long. 117°27–30′ (82K/3W)
West side of upper Slocan Lake, along Shannon and lower Wragge Creeks.

Claims: About 20 located claims, including VICTIM, LEONA, VIC.

Access: By logging-roads.

Operator: ARGEM EXPLORATIONS LTD., 1950 Lonsdale Avenue, North Vancouver.

Metal: Molybdenum.

Work done: A soil geochemical survey for zinc and molybdenum was done. One hundred and ninety-one samples were taken at intervals along Wragge Creek and the logging-roads and trails north of it.

Reference: Assessment Report 2393.

SLOCAN

GOLDSTREAM, JACK (No. 37, Fig. K)

Location: Lat. 49°45′ Long. 117°22′ (82F/11W)
At approximately 5,000 feet elevation, on Chapleau Creek, 5 miles east of Slocan.

Claims: GOLDSTREAM 1 to 4, JACK 1 to 6.

Access: By road from Highway 6, 9 miles.

Owner: GOLDSTREAM MINES LTD., Box 54, Slocan.

Metals: Gold, silver.

Description: Quartz containing pyrite, chalcopyrite, galena, and argentite occur in fault and fissure zones.

Work done: Two miles of road constructed on Goldstream 4 and Jack 2 and 3; 3,000 feet of trenching on Jack 1 to 3.

SLOCAN PRINCE (No. 88, Fig. K)

By P. E. Olson

Location: Lat. 49°47′ Long. 117°20′ (82F/14W)
The Slocan Prince group is situated at the head of Crusader Creek, a tributary of Lemon Creek.

Claims: SLOCAN PRINCE (Lot 582), BLACK PRINCE Fraction (Lot 584), TWO FRIENDS (Lot 1020), BANK OF ENGLAND (Lot 2214), MOONRAKER (Lot 8939) Crown-granted mineral claims.

Access: Via the Springer Creek road from Slocan.

Owner: DELMAR HANNEM, 240—90th Avenue SE., Calgary, Alta.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done: Most of the old portals were cleared and some stripping was done in 1970. A truck load of selected ore from the old workings was shipped to the Trail smelter.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1962, p. 84.

METEOR (No. 91, Fig. K)

By P. E. Olson

Location: Lat. 49°46.5′ Long. 117°21.2′ (82F/14W)
The mine is in the Meteor Basin which is formed at the head of Tobin Creek, a tributary of Springer Creek from the south. The workings lie between elevations of 6,700 and 7,000 feet.

Claims: METEOR (Lot 2893), DEADWOOD (Lot 3576), OTTAWA No. 5 (Lot 2892), CULTUS (Lot 2891).

Access: Via mining-roads from Slocan along Springer and Tobin Creeks, a distance of about 9 miles, the last 3 miles of which is in need of repairs.

Owner: Cultus Exploration Ltd.

Operator: WILBUR BROOKS AND ASSOCIATES.

Metal: Silver.

Work done: Some raising and exploration work were done above No. 5 level, with poor results.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 249.

HECLA (No. 36, Fig. K)

Location: Lat. 49°46′ Long. 117°23′ (82F/14W)
At approximately 6,000 feet elevation, on Springer Creek, 4 miles east of Slocan.

Claims: HECLA 1 to 10.

Access: By road from the Ottawa mine road, 3 miles.

Owner: GOLDSTREAM MINES LTD., Box 54, Slocan.

Metals: Silver, lead.

Description: Trenching revealed a breccia shear zone up to 14 feet wide cutting through porphyritic granite. The breccia zone is cemented with barite as well as stringers of quartz mineralized with pyrite, sphalerite, galena, tetrahedrite, and argentite.

Work done: Trenching, 3,600 feet on Hecla 1 to 3.

Reference: *Geol. Surv., Canada,* Mem. 184, p. 170.

OTTAWA (No. 65, Fig. K)

By P. E. Olson

Location: Lat. 49°47.4′ Long. 117°24′ (82F/14W)
On the south side of Springer Creek, 5 miles from Slocan.

Claims: The OTTAWA Crown-granted mineral claim (Lot 4968) and 10 other claims.

Access: Via the Springer Creek road, which leaves the Slocan–Nelson highway one-half mile south of Slocan.

Owner: Slocan Ottawa Mines Ltd.

Operator: PAMICON DEVELOPMENTS LTD.

Metal: Silver (*see* Table 1 for production).

Work done: The Ottawa mine has a long history of development and production, but activity at this mine has dropped off recently. The company owns a complete 75-tons-per-day mill which has been idle during the last year. Since 1965, all production has come from the Nos. 8 and 9 areas, but ore reserves in these places are practically gone. About 1,000 feet of drifting and crosscutting was done, mainly from No. 9 level, with discouraging results. Several cars of ore were shipped by the leasers during the early part of the year.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 324.

ARLINGTON (No. 66, Fig. K)

By P. E. Olson

Location: Lat. 49°47.4′ Long. 117°21.6′ (82F/14W)
The Arlington mine is on the north side of Springer Creek, about 7 miles from Slocan. Main workings are at an elevation of 5,200 feet.

Claims: Sixteen Crown-granted and recorded mineral claims, including the ARLINGTON (Lot 2416).

Access: Via the Springer Creek road, which leaves the Slocan–Nelson highway immediately south of Slocan.

Owner: ARLINGTON SILVER MINES LTD., 809, 525 Seymour Street, Vancouver 2.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Description: The Arlington mine has been operated intermittently since the late 1800's. Continuous fractures and brecciated zones, several feet wide, contain scattered lenses of rich silver-lead-zinc mineralization accompanied by native silver. The property has been developed by eight levels and numerous cuts and trenches. The lowest level (A level) is the principal working. Much work has been done on the next level higher (B level). Except for some diamond drilling, all work in recent years has been confined to A and B levels.

WORK DONE: An effort was made during 1970 to ship sufficient ore to cover costs. Some development and stoping were done above A level, and some dump rock was shipped along with stoped ore. The mine was shut down in December for an indefinite period. Very little known ore remains within the workings.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 324.

LITTLE TIM (No. 67, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°48.4′ Long. 117°22.4′ (82F/14W)
The Little Tim mine is near the head of Little Tim Creek, a tributary of Springer Creek from the north. The mine workings are at an elevation of 6,600 feet.

CLAIMS: The area is held by 16 recorded mineral claims, with main workings lying on the V DAY.

ACCESS: By 4 miles of jeep road from the Ottawa mine.

OWNER: MOLY-WIN MINING LTD., 827, 510 West Hastings Street, Vancouver 2.

METALS: Silver, lead.

DESCRIPTION: The main workings develop a vein striking about north 60 degrees east and dipping about 60 degrees to the southeast. Host rock is coarse-grained porphyry of the Nelson Batholith. Mineralization and geology of the Little Tim are very similar to that of the Ottawa and Arlington mines.

WORK DONE: A minor amount of road work was done in 1970.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 324.

COLORADO, WHITE HOPE (No. 4, Fig. K)

LOCATION: Lat 49°49.1′ Long. 117°20.1′ (82F/14W)
At approximately 3,400 feet elevation on Memphis Creek, 5 miles north of Slocan City.

CLAIMS: WHITE HOPE, WHITE HOPE 1 to 22.

ACCESS: By road from Slocan City, 5 miles.

OWNER: Rama Mining & Development Limited.

OPERATOR: HYPERION SILVER MINES LIMITED, Box 565, Kinnaird.

METALS: Silver, lead, zinc.

WORK DONE: Underground work, 140 feet of raising on White Hope 8.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 325; *Geol. Surv., Canada*, Mem. 184, p. 170.

HOMESTAKE (No. 68, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°49.2′ Long. 117°25′ (82F/14W)
On the north side of Memphis Creek, about 1 mile east of the Slocan–Silverton highway, and at an elevation of 4,000 feet.

CLAIMS: The HOMESTAKE Crown-granted mineral claim (Lot 15283).

ACCESS: Via 2 miles of jeep road from the Slocan–Silverton highway.

OWNER: C. THICKETT AND ASSOCIATES, Slocan.

METALS: Gold, silver (*see* Table 1 for production).

DESCRIPTION: The Homestake vein outcrops where the mountain slope breaks over into the Memphis Creek valley. It has been developed by two short adits and several raises. Significant gold and silver values appear to be associated with pyrite mineralization which is found in bunches in a quartz vein. Surrounding rock is a coarse-grained porphyry which is part of the Nelson Batholith.

Work done: Exploration and stoping were continued from the lower level and some ore was shipped to the Trail smelter. Results were discouraging and the operation was shut down in the latter part of 1970.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 325.

SILVERTON

ROCKLAND (No. 96, Fig. K)

By P. E. Olson

Location: Lat. 49°52.8′ Long. 117°22.1′ (82F/14W)
On Aylwin Creek at an elevation of 4,000 feet.

Claims: Five Crown-grants, including the ROCKLAND (Lot 3884), WILLA (Lot 1529), LITTLE DAISY (Lot 7302). There are short adits on each of the above-named claims.

Access: Via 2 miles of steep mining-road which leaves the Slocan–Silverton highway north of Aylwin Creek.

Owner: Rockland Mining Ltd.

Operator: W. WINGERT, New Denver (under contract arrangement).

Metals: Copper, molybdenum.

Work done: Road access to the several adits was provided and all portals were cleared and retimbered. Diamond drilling was started at the Little Daisy portal. Of seven proposed holes, none was completed by the end of 1970.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1965, p. 193.

COMSTOCK (No. 83, Fig. K)

By P. E. Olson

Location: Lat. 49°43′ Long. 117°14′ (82F/14E)
On the height of land east of Fennell Creek, which flows northerly into Silverton Creek. Principal workings are at 6,100 feet in elevation.

Claims: The COMSTOCK (Lot 1814) and several other Crown-granted and recorded mineral claims.

Access: From Silverton via logging and mining-roads along Silverton and Fennell Creeks, a distance of 11 miles.

Owner: R. H. MURPHY AND PARTNERS, Nakusp.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done: A temporary mining-road was put in to the Comstock workings and a small amount of dump material was shipped to the Trail smelter. A truck load of selected rock from the old workings was also shipped to the Trail smelter.

References: *Minister of Mines, B.C.*, Ann. Rept., 1904, pp. 176, 177; *Geol. Surv., Canada*, Mem. 184, p. 33.

HEWITT (No. 69, Fig. K)

By P. E. Olson

Location: Lat. 49°56′ Long. 117°18′ (82F/14W)
The Hewitt mine is on the south side of Silverton Creek, about 3 miles east of Silverton, at an elevation of 4,000 feet.

Claims: HEWITT (Lot 4440), LORNA DOONE (Lot 1401) Crown-granted mineral claims.

Access: Via 5 miles of mining-road from Silverton to the main workings.

Owner: A. K. Lotze.

OPERATOR: SURFSIDE EXPLORATIONS LTD., 882 Maple Street, White Rock.

METALS: Silver, lead, zinc (*see* Table 1 for production).

WORK DONE:

In recent years, an internal shaft below No. 10 level has been deepened to No. 13 level. This shaft is inclined to follow the general plunge of ore in the mine, and the No. 13 level shows ore at the shaft. Mining has been done in close proximity to the shaft, which has subsequently begun to fail, mainly around No. 12 level. The mine has been described in reports of the British Columbia Minister of Mines and Petroleum Resources.

No. 13 level was completed and exposed fair ore over a length of about 60 feet and a width of around 10 feet. Raising was done to No. 12 level, followed by stoping. Ore from these workings was hauled to the Silverton mill for concentrating. Ground failure in stopes and the general high cost of mining necessitated closing of the operation in 1970 before known ore reserves were extracted.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 326; *Geol. Surv., Canada*, Mem. 184, pp. 51–58.

LUCKY THOUGHT (No. 3, Fig. K)

LOCATION: Lat. 49°56.3′ Long. 117°18′ (82F/14W)
At approximately 3,800 feet elevation, 4½ miles east of Silverton.

CLAIMS: Nine recorded claims, AU covering ground formerly held as Crown-granted claims, including LUCKY THOUGHT (Lot 10636).

ACCESS: By road from Silverton, 4½ miles.

OPERATOR: SURFSIDE EXPLORATIONS LTD., 882 Maple Street, White Rock.

WORK DONE: Claims and surface workings mapped; surface geological mapping, 1 inch equals 100 feet on four claims; examination of old workings; geochemical survey, 258 samples covering four claims; three-quarters of a mile of road construction; 800 feet of trenching on AU 1 which disclosed a narrow high-grade vein of galena 350 feet above old Lucky Thought workings.

BOSUN (No. 70, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°58.4′ Long. 117°21.8′ (82F/14W)
Astride the Silverton–New Denver highway, 1 mile north of Silverton.

CLAIMS: The BOATSWAIN Fraction (Lot 3112) and other adjoining Crown-granted mineral claims.

ACCESS: A short mining-road from the Silverton–New Denver highway services No. 6 level, which is near Slocan Lake.

OWNER: Red Deer Valley Coal Company, Limited.

OPERATOR: LARCH MINING LTD., Silverton.

METALS: Silver, lead, zinc.

WORK DONE: The Bosun mine has been idle for many years and most of the levels are blocked by caves near their portals. No. 6 level is located a few feet above Slocan Lake and passes under the highway. This level passes through several hundreds of feet of glacial till. No. 6 level was cleared for a distance of about 200 feet from the portal at considerable cost, and was subsequently shut down. It was suspected that another 200 feet of caved ground still had to be cleared.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 327.

SANDON

SILVER BELL (No. 71, Fig. K)

By P. E. Olson

Location: Lat. 49°58.7′ Long. 117°18.3′ (82F/14W)
About 1 mile north of Idaho Peak.

Claims: SILVER BELL (Lot 1887) Crown-granted mineral claim.

Access: Via jeep road from Sandon, which services the Queen Bess and Alamo properties.

Owner: Peter Heron.

Operator: W. WINGERT, New Denver.

Metals: Silver, lead, zinc.

Work done: The Silver Bell property contains the southwesterly limb of the Idaho-Alamo lode complex which has been explored by several adits and cuts. The mine has a history of minor production of hand-sorted ore containing about 1½ ounces of silver per unit of lead. During recent years, small shipments have been made by various leasers. An adit was established above the main workings at an elevation of about 7,000 feet. A lode was encountered at about 100 feet and then followed for another 100 feet. Some scattered, fine-grained galena was noted along the lode.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 327.

SILMONAC (MINNIEHAHA) (No. 72, Fig. K)

By P. E. Olson

Location: Lat. 49°58.3′ Long. 117°15.2′ (82F/14W)
One mile southwest of Sandon.

Claims: Sixty-two Crown-granted mineral claims and three mineral leases. The 4625 level now operated by the company is collared on the MINNIEHAHA (Lot 3170).

Access: The property is serviced by good, recently improved mining-roads from Sandon.

Owner: Silmonac Mines Ltd.

Operators: KAM-KOTIA MINES LIMITED and BURKAM MINES LTD., New Denver.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done:

A lode system, originally located by diamond drilling from an extension of the Ruth Hope No. 5 level, was further explored by surface drilling, and more recently by underground workings and drilling from the 4625 level. A considerable amount of ore was indicated by this exploration.

Exploration and stope development were accelerated during the year, and the Carnegie mill was overhauled and placed in running condition at a rated capacity of 150 tons per day. The mine and mill went into production early in September, and treated about 4,500 tons per month. The company employs about 60 men.

A Caterpillar diesel-driven generator of 312-kva. capacity was installed at the Carnegie mill to provide electric power.

New equipment installed in the mill consisted of:

Six Denver 18-inch flotation cells.
A 5 by 5-foot Denver ball mill and 60-horsepower motor replaces a 4 by 5-foot mill and 50-horsepower motor.
Two 10-kva. single-phase dry-type transformers.
One 15-kva. three-phase dry-type transformer.
One 2-inch Denver vertical pump.

At the mine the following was installed:

Three thousand feet of 600-volt Teck cable for 440-volt underground electrical system.

One 5-horsepower locomotive battery-charging set.

One 7-horsepower axial vane ventilation fan and one 15-horsepower fan.

On the surface a 125-kva. Caterpillar diesel-driven electric set and a Gardner-Denver 900-cubic-feet-per-minute portable compressor were installed.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 328.

VICTOR (No. 72, Fig. K)

By P. E. Olson

LOCATION: Lat. 50°00′ Long. 117°16.1′ (82F/14W)
Immediately south of Three Forks.

CLAIMS: The VICTOR (Lot 4564) and a large block of adjoining Crown-grants.

ACCESS: By 2 miles of good road that leaves Sandon at the Carnegie mill.

OWNER: Kam-Kotia Mines Limited.

OPERATOR: E. PEREPOLKIN AND ASSOCIATES, Sandon.

METALS: Silver, lead, zinc (*see* Table 1 for production).

WORK DONE: The Victor mine has been shut down since 1960, but has been under salvage or lease arrangement continuously since. Shipping ore has become harder to locate in recent years. In 1970 a minor amount of leasing was done in the vicinity of No. 5 level. Some hand-sorted ore was shipped to the Trail smelter during the summer.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 328.

SLOCAN SOVEREIGN (No. 74, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°59.2′ Long. 117°11.7′ (82F/14E)
On Reco Mountain, about 1 mile north of Cody.

CLAIMS: The property consists of one Crown-granted mineral claim (Lot 1927).

ACCESS: Via the Cody-Reco mine road from Cody.

OWNER: Liberty Mines Ltd.

OPERATOR: CODY MILLING & SMELTING LTD., 403, 1200 West Pender Street, Vancouver 1; field office, Kaslo.

METALS: Silver, lead, zinc.

WORK DONE: The Slocan Sovereign mine is developed by three levels, and many raises and stopes. A fourth level, located about 30 feet under No. 3 level, serves as an ore transfer facility only. These levels are both collared on the Mollie Crown-granted mineral claim owned by Reco Silver Mines Limited. Most of the year was taken up in a lawsuit between Cody and Reco, which resulted in the former being forbidden the use of the surface of the Mollie claim. The exploration of the Slocan Sovereign claim was halted after the lawsuit.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 329.

RECO, BLUEBIRD (No. 74, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°59.4′ Long. 117°10.9′ (82F/14E)
On Reco Mountain, about 1 mile northeast of Cody, at elevations of 4,000 to 7,000 feet.

CLAIMS: The property consists of 68 recorded and Crown-granted mineral claims, including the BLUEBIRD (Lot 540) and NOBLE 5 (Lot 468).

ACCESS: By mining-road from Sandon via Cody.

Owner: Mrs. J. M. Harris.

Operator: RECO SILVER MINES LIMITED, 201, 535 Howe Street, Vancouver 1.

Metals: Silver, lead, zinc.

Work done: The company holdings embrace several well-known mines from which considerable production has been taken. During recent years the properties have been re-examined with a view to locating new veins or extensions of mined-out veins. Except on the Chambers, no underground work has been undertaken in recent years. Geological studies of the area were continued during the year, and a small advance was made on the Chambers drift which was also worked in 1969.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 329.

ALTOONA (No. 74, Fig. K)

By P. E. Olson

Location: Lat. 49°59.6′ Long. 117°14.7′ (82F/14E)
One mile northwest of Sandon.

Claims: ALTOONA (Lot 1819) Crown-granted claim.

Access: Via a mining-road located on the abandoned Kaslo and Slocan railway grade.

Owner: Hallmac Mining Syndicate.

Operator: PUMA INDUSTRIES LTD.

Metals: Silver, lead, zinc.

Work done: No. 2 level was rehabilitated and some drifting and raising done.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1966, p. 222.

MERCURY (No. 74, Fig. K)

By P. E. Olson

Location: Lat. 49°59.7′ Long. 117°14′ (82F/14E)
The property is below the Payne mine road, 2 miles north of Sandon.

Claims: MERCURY (Lot 3531), REDRESS Fraction No. 2 (Lot 3209).

Access: Via the Payne mine road from Sandon.

Owner: PAT McCRORY, New Denver.

Metals: Silver, lead, zinc.

Work done: In 1970, stripping, diamond drilling, and some underground work were done by the owner. Sufficient mineralization has been found to encourage further work. About 100 tons of milling ore has been stockpiled at No. 2 level of the old workings.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 252.

RETALLACK-THREE FORKS

McALLISTER (No. 75, Fig. K)

By P. E. Olson

Location: Lat. 50°03.4′ Long. 117°14.6′ (82K/3E)
On the northwest slope of London Ridge, about 3 miles from Three Forks, at an elevation of 5,500 to 5,900 feet.

Claims: ROWSE Fraction (Lot 11901) Crown-granted mineral claim, and several adjoining claims.

Access: Via 4 miles of fair mining-road along Kane Creek from Three Forks.

Owner: LIBERTY MINES LTD., Kaslo.

Metal: Silver.

Work done: The McAllister mine has produced considerable ore from a quartz vein carrying disseminated tetrahedrite associated with silver. A cable tram was used to haul ore from the mine to the Kane Creek valley. Dumps were sampled and found to contain very little of value.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 330.

ANTOINE (No. 77, Fig. K)

By P. E. Olson

Location: Lat. 50°00.2′ Long. 117°11.8′ (82K/3E)
Near the head of McGuigan Creek, a tributary of Seaton Creek from the south.

Claims: The ANTOINE Crown-grant (Lot 516) and several adjoining mineral claims.

Access: Via 9 miles of good road, which leaves the Kaslo–New Denver highway 3 miles east of Three Forks.

Owner: ANTOINE SILVER MINES LTD., 506, 905 West Pender Street, Vancouver 1.

Metals: Silver, lead, zinc.

Work done: Some mining equipment was removed from the mine and sold in Nelson.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 331.

WASHINGTON (No. 76, Fig. K)

By P. E. Olson

Location: Lat. 50°00.1′ Long. 117°13.1′ (82K/3E)
On the south side of McGuigan Creek, at an elevation of 5,800 to 6,400 feet.

Claims: Fourteen claims, including the WASHINGTON (Lot 541), SLOCAN BOY (Lot 626) Crown-grants.

Access: Via the Antoine mine road, which follows the north side of McGuigan Creek.

Owner: Larch Mining Ltd.

Operator: RED DEER VALLEY COAL COMPANY, LIMITED, Box 93, Silverton.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done: Exploration continued for a short period during the year, under the direction of W. McLeod, of Silverton. Several bulldozer cuts were made in the vicinity of the old workings. During 1969 and 1970 some dump rock from the Washington was trucked to the Red Deer Valley Coal Company mill at Silverton. Concentrates from this milling were shipped to the Trail smelter.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 330.

COWBOY, TEXAS, FOURTH OF JULY (No. 78, Fig. K)

By P. E. Olson

Location: Lat. 50°00′ Long. 117°08.3′ (82K/3E)
Near the head of Robb Creek, a tributary of Kaslo Creek from the south.

Claims: COWBOY (Lot 4888), TEXAS (Lot 4889), FOURTH OF JULY (Lot 2052), and several other Crown-granted and recorded mineral claims.

Access: Via a steep mining-road from the Kaslo–New Denver highway, about 17 miles west of Kaslo.

Owner: L. N. Garland.

Operator: MATRIX EXPLORATION LTD., 404 Northgate Building, Edmonton 15, Alta.

Metals: Silver, lead, zinc.

Description: The claims are underlain by slatey shales, quartzitic sandstone, and limestone of the Slocan Series of Triassic age. This sedimentary series is cut by numerous dykes, sills, and small stocks of diorite, granodiorite, and related intrusives associated with the emplacement of the Nelson Batholith during Early Cretaceous time.

Work done: Surface exploration and diamond drilling were done during the year under the direction of M. P. McDougall, RR 1, Nelson. The downward extensions of known mineralized structures were intersected by diamond-drill holes, thus demonstrating downward continuity for at least 200 feet. In all, six holes totalling 1,643 feet were drilled.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 331.

WINONA, BOON (No. 78, Fig. K)

By P. E. Olson

Location: Lat. 50°00.1′ Long. 117°10.6′ (82K/3E)
The Winona group is situated on the east slope of Reco Mountain.

Claims: WINONA (Lot 10061), BOON (Lot 10062), and 16 other Crown-granted and recorded mineral claims.

Access: By fair mining-road from Retallack via Stenson Creek.

Owner: HILROY MINES LTD., 925, 510 West Hastings Street, Vancouver 2.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Description: The Winona group of claims covers an alpine area underlain by argillites and numerous dykes and sills common to the area. Several lodes cross the area in a general easterly direction. Exploration and prospecting around the turn of the century uncovered sections of the lodes where significant values in silver, lead, and zinc were mined. Recent exploration has reconfirmed the presence of these structures.

Work done: Some hand-sorted ore from the Winona mine dumps and from exposures on the Boon claim was shipped to the Trail smelter. Some road work was done on the claims.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 254.

DUBLIN QUEEN (No. 78, Fig. K)

By P. E. Olson

Location: Lat. 50°00.3′ Long. 117°09.7′ (82K/3E)
Near the head of Stenson Creek, a tributary of Kaslo Creek from the south.

Claims: The company holds nine Crown-granted mineral claims, including the DUBLIN QUEEN (Lot 1167).

Access: Via 4 miles of fair mining-road, which leaves the Kaslo–New Denver highway at Retallack.

Owner: ISKUT SILVER MINES LTD., 534 Burrard Street, Vancouver 1.

Metals: Silver, lead, zinc.

Work done: For several years, the company has been exploring in the vicinity of the Dublin Queen by surface stripping and underground drifting. Sufficient mineralization has been found to warrant a few small shipments to the Trail smelter and to encourage further exploration. In 1969 a new level was collared on the Dublin Queen and advanced about 25 feet. During 1970 this level was advanced about 200 feet, mainly along the Dublin Queen vein structure. Some scattered, fine-grained lead mineralization was encountered.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 332.

PANAMA (No. 86, Fig. K)

By P. E. Olson

Location: Lat. 50°03.8′ Long. 117°12.3′ (82K/3E)
On London Ridge, about 1½ miles west of Zincton. Recent workings are at an elevation of 6,900 feet.

Claims: The PANAMA Crown-grant (Lot 3152) and several adjoining claims.

Access: Via 3½ miles of very steep road from Fish Lake, on the Kaslo–New Denver highway.

Owner: Vimy Explorations Ltd.

Operator: T. I. STEENHOFF, New Denver.

Metal: Silver (*see* Table 1 for production).

Work done: Two small shipments of selected ore from recent workings were sent to the Trail smelter.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 331.

REVENUE (No. 35, Fig. K)

Location: Lat. 50°04′ Long. 117°07′ (82K/3E)
At approximately 3,500 feet elevation, between Whitewater and Lyle Creeks, 2 miles east of Retallack.

Claims: Twenty, including Crown-granted claims REVENUE (Lot 2826), DEFENDER (Lot 2827), HOWARD (Lot 2828), RECOVERY Fraction held as a mineral lease.

Access: By road from the Kaslo–New Denver highway, approximately 17 miles from Kaslo.

Owner: MATRIX EXPLORATION LTD., 404, 10049 Jasper Avenue, Edmonton, Alta.

Metals: Silver, lead, zinc.

Description: Predominately slatey, carbonaceous shales with interbedded quartzites and limestones contain sphalerite, tetrahedrite, and argentite in a gangue consisting mainly of quartz, siderite, and calcite.

Work done: Surface diamond drilling, two holes totalling 665 feet on Revenue and Recovery Fraction.

KAT (No. 35, Fig. K)

Location: Lat. 50°02′ Long. 117°06′ (82K/3E)
East side of Lyle Creek, 3 miles west of Retallack.

Claims: KAT 13, 15.

Access: By road from the Kaslo–New Denver highway.

Owner: D. W. SMELLIE, 1666 West Broadway, Vancouver 9.

Metals: Silver, lead, zinc.

Work done: An electromagnetic survey was done along three lines, 500 and 1,700 feet east of the eastern boundary of the Revenue Crown-granted claim (Lot 2826).

Reference: Assessment Report 2661.

KEEN CREEK

FLINT MINE (No. 93, Fig. K)

By P. E. Olson

Location: Lat. 49°55.7′ Long. 117°06.1′ (82F/14E)
The Flint mine is near the head of Carlyle Creek, a tributary of Keen Creek. Main workings are at an elevation of 5,250 feet.

CLAIMS: The FLINT No. 3 recorded mineral claim covers the main workings. There are several other recorded and Crown-granted claims in the vicinity, including the GRANITE KING (Lot 4538).

ACCESS: A recently constructed mining-road provides access to the lower Flint workings via Keen and Carlyle Creeks.

OWNER: MUKLUK MINING LTD., 302, 535 West Georgia Street, Vancouver 2.

METALS: Silver, lead, zinc.

DESCRIPTION: The Flint mine has been developed by four main levels and has been stoped where ore was found. The lowest level (No. 1 level) is the main working. This level has 220 feet of crosscut in Nelson granite and thereafter follows the Flint lode which strikes northerly and dips steeply to the west. The dump at the portal of No. 1 level is composed mainly of crosscut material, although there is some ore scattered over the surface of the dump.

WORK DONE: A steep mining-road was built to the mine, the dumps were sampled, and the lower portal opened up. Plans to haul the dumps to a local mill were abandoned prior to the onset of winter.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1953, p. 137; *Geol. Surv., Canada*, Mem. 184, pp. 217, 218.

SIXTEEN TO ONE (No. 94, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°54.9′ Long. 117°03.9′ (82F/14E)
About 1 mile north of the confluence of Carlyle and Keen Creeks.

CLAIMS: SIXTEEN TO ONE (Lot 4901) and several other adjoining claims.

ACCESS: Via the Keen Creek mining-road from the Kaslo–New Denver highway.

OWNER: MUKLUK MINING LTD., 302, 535 West Georgia Street, Vancouver 2.

METALS: Silver, lead.

WORK DONE: During construction of the Flint mine road, a mineralized shear striking north 55 degrees east and dipping vertically was exposed and found to carry significant values in silver. A crosscut was driven to the downward projection of this exposure and then the shear was followed for about 100 feet. The operators reported assays for silver in the order of 40 ounces per ton were obtained from samples taken from the shear, which averages about 30 inches wide.

REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1899, p. 703; *Geol. Surv., Canada*, Mem. 184, pp. 228, 229.

REVENUE (No. 97, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°49.5′ Long. 117°07.3′ (82F/14E)
On the north side of Sturgess Creek, a tributary of Keen Creek from the southeast, at an elevation of 6,600 feet.

CLAIMS: REVENUE (Lot 7139), TAMRAC (Lot 7140), REVENUE Fraction (Lot 7141), BIRTHDAY (Lot 7138).

ACCESS: A new road reaches to within 1 mile of the property from the main Keen Creek road to the Joker millsite.

OWNER: ANDREW BORDULA, Nakusp.

METALS: Silver, lead, zinc.

DESCRIPTION: The property lies within the Kokanee Glacier Park. Values in silver, lead, and zinc are found in a north-striking shear dipping very steeply to the west. The country rock is Nelson granite. The mine was explored by four adits prior to 1929.

Work done: A road to the property was built to within a mile of the mine and the upper level was partially opened.

References: *Minister of Mines, B.C.,* Ann. Rept., 1929, p. 321; *Geol. Surv., Canada,* Mem. 184, p. 243.

WOODBURY CREEK

SCRANTON (No. 79, Fig. K)

By P. E. Olson

Location: Lat. 49°47.3′ Long. 117°03.6′ (82F/14E)
In Kokanee Glacier Park, near the head of Pontiac Creek, a tributary of Woodbury Creek from the south.

Claims: SCRANTON (Lot 7452), GRANDVIEW (Lot 6279), and several other Crown-granted and recorded mineral claims.

Access: Via 11 miles of good mining-road along Woodbury Creek from Ainsworth–Kaslo highway.

Owner: SILVER STAR MINES LTD., 400, 837 West Hastings Street, Vancouver 2.

Metals: Gold, silver, lead, zinc (*see* Table 1 for production).

Work done: Considerable road work was done to facilitate haulage of ore from the mine to the Blue Star mill at Ainsworth. Drifting, raising, and stoping were done on the 5700 level, and stoping and raising were done on the 5900 level. All production was hauled to the mill at Ainsworth. Stoping of ore proved uneconomical and the operation was shut down early in the year. After the shut-down, the first bridge across Woodbury Creek collapsed and was not replaced.

Reference: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 333.

AINSWORTH

ATTENDED, LAURIER (No. 5, Fig. K)

Location: Lat. 49°46.5′ Long. 116°55.5′ (82F/15W)
At approximately 3,200 feet elevation, 3 miles north of Ainsworth.

Claims: ATTENDED (Lot 978), LAURIER (Lot 3346), RFG Fraction (Lot 12719), TAMRAK (Lot 3341) Crown-granted claims and 20 recorded claims.

Access: By road from Ainsworth, 3 miles.

Owner: HI-LODE MINING CO. LTD., Box 40, Nakusp.

Metals: Silver, lead, zinc.

Work done: Trenching, 10 by 500 feet on Laurier; stripping, 10 by 2,000 feet on Attended and Laurier.

Reference: *B.C. Dept. of Mines,* Bull. 53, 1967, pp. 80, 108.

TRIUMPH MINE (No. 95, Fig. K)

By P. E. Olson

Location: Lat. 49°46.3′ Long. 116°56.3′ (82F/15W)
The Triumph mine is immediately south of Lendrum Creek on the Silver Glance Crown-grant.

Claims: The property consists of five Crown-granted and three recorded claims as follows: SILVER GLANCE (Lot 1439), HARRISON (Lot 4380), FREE SILVER (Lot 4377), GLEN ELLEN (Lot 439), SILVER BELL (Lot 4378), the HERCULES, SULLIVAN, and NORANDA recorded claims.

Access: Via the Cody Caves road, which leaves the Ainsworth–Kaslo highway south of Woodbury Creek.

OWNER: PERRY CREEK MINES LTD., 1202, 1177 West Hastings Street, Vancouver 1.

METALS: Silver, lead, zinc.

DESCRIPTION: Significant mineralization has been exposed by stripping along a north-south limestone bed exposed to the northeast of the Glen Ellen on the Noranda mineral claim. Fractures cutting the limestone carry sulphide mineralization, but replacement appears quite local. The company plans further exploration in this area.

WORK DONE: A great deal of stripping was done along a limestone bed adjacent to the Cody Caves road, and some rock cuts were sunk on the Silver Glance near the Triumph mine.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1965, p. 186.

SILVER HOARD (No. 80, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°44.8′ Long. 116°57.1′ (82F/10W)
The workings are at an elevation of 4,300 feet on the south side of Cedar Creek, 1 mile north of Ainsworth.

CLAIMS: SILVER HOARD (Lot 10712), DELLIE Fraction (Lot 10711) Crown-granted claims.

ACCESS: Via the Cody Caves access road, which leaves the Ainsworth–Kaslo highway 1 mile south of Woodbury Creek.

OWNER: C. Lind.

OPERATOR: R. B. STRONG, Winlaw.

METALS: Silver, lead, zinc (*see* Table 1 for production).

WORK DONE: Two truck loads of hand-sorted ore were shipped to the Trail smelter.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 333.

RIONDEL

BLUEBELL MINE (No. 87, Fig. K)

By P. E. Olson

LOCATION: Lat. 49°45.7′ Long. 116°51.5′ (82F/15W)
The mine is on the east side of Kootenay Lake, about 6 miles north of Kootenay Bay.

CLAIMS: KOOTENAY CHIEF (Lot 11), COMFORT (Lot 12), BLUEBELL (Lot 50), and many other Crown-granted and recorded mineral claims.

ACCESS: Six miles by good road from the Kootenay Bay–Crawford Bay highway.

OWNER: COMINCO LTD.; company office, Trail; mine office, Riondel.

METALS: Silver, lead, zinc (*see* Table 1 for production).

WORK DONE: Mill production was maintained at a daily rate of about 600 tons, the main production coming from pillar recovery. Deslimed tailings were used for backfill as stoping progressed upwards. Ore reserves continued to drop during the year, with a subsequent drop in available working places. Two 50-horsepower Canadian Ingersoll Rand hoists were installed. One 30-horsepower slusher was converted from air to electric. One 40-horsepower pump was installed at the north end of the No. 8 level.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 337.

CRAWFORD CREEK

HUMBOLT (No. 15, Fig. K)

LOCATION: Lat. 49°44′ Long. 116°43′ (82F/10E)
At approximately 6,400 feet elevation, on Spring Creek, 6 miles east of Riondel.

CLAIMS: One hundred and eleven claims in three groups, including the Crown-grants HUMBOLT and SAILORBOY and recorded claims BAREFOOT, HOPE, JOAN, etc.

ACCESS: By gravel road and trail from Crawford Bay, 14 miles.

OWNER: ROSE PASS MINES LTD., 630A—17th Avenue SW., Calgary 3, Alta.

METALS: Silver, lead, zinc.

DESCRIPTION: Argentiferous galena occurs in dolomite-quartz veins in phyllite.

WORK DONE: Road construction, one-half mile on Spring Creek; trenching, 1,200 feet on Barefoot 1 and 2; surface diamond drilling, two holes totalling 813 feet on Barefoot 2.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 337.

UNITED COPPER (No. 34, Fig. K)

LOCATION: Lat. 49°43.5′ Long. 116°36′ (82F/10E)
Between 6,500 and 7,200 feet elevation, 12 miles northeast of Crawford Bay.

CLAIMS: UNITED COPPER.

ACCESS: From Crawford Bay by road, 15½ miles.

OPERATOR: COGLE COPPER LIMITED, 704 Railway Street, Nelson.

METALS: Copper, silver, zinc, lead.

DESCRIPTION: Quartz veins and lenses carrying chalcopyrite, sphalerite, galena, pyrite, and pyrrhotite along shear zones and in the foliations of chlorite schist. Bornite with silver minerals in limestone replacement and quartzite alteration.

WORK DONE: Trenching, 10 by 4 by 2 feet; stripping, 6 by 20 by 5 feet; surface diamond drilling, three holes totalling 265 feet on United Copper 2.

LARDEAU

MOONSHINE (No. 82, Fig. K)

By P. E. Olson

LOCATION: Lat. 50°08.2′ Long. 116°57.4′ (82K/2W)
On the west side of the Kaslo–Lardeau highway, 1 mile south of Lardeau.

CLAIMS: Principal claims are the MOONSHINE (Lot 1881), RIGHT BOWER (Lot 1882) Crown-grants.

ACCESS: A short access road leaves the Kaslo–Lardeau highway about one-quarter mile south of Davis Creek.

OWNER: DENNIS HOLDINGS LTD., 53, 845 Hornby Street, Vancouver 1.

METALS: Silver, lead, zinc.

WORK DONE: Pillars in the old workings were removed and the hangingwall subsequently caved, blocking all the upper workings. After an area had been stripped for a new lower adit, the operation was shut down.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 335.

DUNCAN RIVER

ISLE (No. 85, Fig. K)

By P. E. Olson

Location: Lat. 50° 14′ Long. 117° 07′ (82K/3E)
Head of John Creek, about 6 miles west of Meadow Creek.

Claims: The ISLE No. 4 recorded mineral claim and several adjoining claims.

Access: Via logging-roads from Meadow Creek.

Owner: R. HANDLEY & ASSOCIATES, Kaslo.

Metals: Silver, lead, zinc, antimony (*see* Table 1 for production).

Work done: Stripping, prospecting, and some road-building were done during the year. A small tonnage of antimony ore was shipped to the Trail smelter.

BRUCE (No. 81, Fig. K)

By P. E. Olson

Location: Lat. 50° 15.4′ Long. 116° 54.8′ (82K/7W)
On Lavina Mountain, 1 mile east of Duncan Dam, at an elevation of 4,000 feet.

Claims: The BRUCE group of eight recorded claims, formerly MAG.

Access: Via a poor switchback road which leaves the Duncan Valley access road about 2 miles north of the Duncan Dam.

Owner: Boundary Exploration Limited.

Operator: WAYNE TURLEY & ASSOCIATE, Kaslo.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done: Drifting and raising, amounting to nearly 200 feet, was done during the year along the zone of mineralization below an outcrop of fairly rich ore. These workings did not encounter any ore. A short adit was put in on the ore outcrop and a small tonnage of selected ore was shipped to Trail from this working.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 335.

PRESIDENT, HAUSER (No. 84, Fig. K)

By P. E. Olson

Location: Lat. 50° 24.9′ Long. 116° 59.6′ (82K/7W)
On Gallop Creek, on the west side of Duncan Dam.

Claims: PRESIDENT (Lot 2066), HAUSER (Lot 2008), and other adjoining Crown-grants and recorded claims.

Access: Via jeep road along Howser Ridge from the Duncan Dam area.

Owner: BOUNDARY EXPLORATION LIMITED, Grand Forks.

Metals: Silver, lead, zinc.

Work done: Considerable bulldozer stripping was done during the year in the vicinity of a high-grade discovery made in 1969. This discovery of rich silver ore was found to be float. Subsequent deep stripping above the showing exposed what appears to be the vein in place.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 336.

IRENE (No. 42, Fig. K)

Location: Lat. 50° 41′ Long. 117° 04′ (82K/11E)
At approximately 2,500 feet elevation, on the east side of the Duncan River, between Irene Creek and Golden Creek.

Claims: IRENE.

Access: From Healy Landing by helicopter, 12 miles.

OWNER: BRYANT MINES LIMITED, 1, 373 Baker Street, Nelson.
METAL: Silver.
WORK DONE: A geophysical survey was made of part of the claim group.

FARSIDE (No. 43, Fig. K)

LOCATION: Lat. 50°45′ Long. 117°10′ (82K/14E)
At approximately 2,500 feet elevation, along the Duncan River, near the mouth of Stevens Creek, 30 miles north of Duncan Lake.
CLAIMS: FARSIDE, PLATEAU, EAST RIVER, CAB, DAB, DOT, JAB, MABEL, FROST, totalling 52.
ACCESS: From Healy Landing by helicopter, 16 miles.
OWNER: Bryant Mines Limited.
OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED, 1050 Davie Street, Vancouver 5.
METAL: Molybdenum.
DESCRIPTION: Quartz veins containing molybdenite, pyrite, pyrrhotite, sphalerite, bismuthinite, scheelite, and apatite occur in schist, slate, and quartzite.
WORK DONE: Surface geological mapping, 1 inch equals 400 feet on 10 claims; magnetometer survey, 10 line-miles covering 13 claims; geochemical soil survey, 504 samples covering 13 claims; trenching, 4,000 cubic feet on Dab and Jab; surface diamond drilling, three holes totalling 1,485 feet on Jab and Cab.
REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 336.

POPLAR CREEK

SPYGLASS (No. 11, Fig. K)

LOCATION: Lat. 50°21.5′ Long. 117°20′ (82K/6W)
On Spyglass Mountain, 10 miles southwest of Poplar Creek.
CLAIMS: SPY, GLASS, KRAZY WOLF, totalling 25.
ACCESS: By helicopter from Poplar Creek, 10 miles.
OWNER: AARN EXPLORATION & DEVELOPMENT CO. LTD., 230, 180 Seymour Street, Kamloops.
METALS: Silver, lead, zinc.
WORK DONE: Trenching, 150 feet on Krazy Wolf 1 to 6; dewatered, reopened, and sampled adit on Krazy Wolf claims.
REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1903, p. 112.

LINSON VIEW, DEE, ZIP (No. 99, Fig. K)

LOCATION: Lat. 50°26′ Long. 117°24′ (82K/6W)
Head of the south fork of Mobbs Creek, 8 miles southwest of Gerrard.
CLAIMS: About 50 located claims: LINSON VIEW, DEE, ZIP, JJ, SILVER RIDGE.
ACCESS: By helicopter from Gerrard.
OPERATOR: TROPHY SILVER MINES LTD., 826, 510 West Hastings Street, Vancouver 2.
METALS: Silver, lead, zinc.
WORK DONE: An airborne magnetometer survey of the valley of the south fork of Mobbs Creek.
REFERENCES: *Minister of Mines, B.C.*, Ann. Rept., 1914, p. 318; Assessment Reports 564, 2315, 2322.

REVELSTOKE MINING DIVISION

PERRY RIVER

RIP (No. 31, Fig. K)

Location: Lat. 51°13′ Long. 118°43′ (82M/2E)
At approximately 6,700 feet elevation, on divide between Anstey River to north and west and Perry River to east.

Claims: RIP 1 to 38.

Access: By helicopter from Revelstoke, approximately 30 air miles.

Owner: EL PASO MINING AND MILLING COMPANY, 500, 885 Dunsmuir Street, Vancouver 1.

Metal: Molybdenum.

Description: Molybdenite occurs disseminated in nepheline and pegmatite dykes which intrude biotite schists and gneisses. Limonite staining is heavy in the zone of interest, being derived from pyrite and pyrrhotite associated with the intrusives.

Work done: Surface geological mapping, 1 inch equals 100 feet on six claims; surface diamond drilling, seven holes totalling 916 feet on Rip 9, 11, and 12.

Reference: *B.C. Dept. of Mines & Pet Res.*, G.E.M., 1969, p. 337.

MARS CREEK

ROBINA (No. 109, Fig. K)

Location: Lat. 51°23′ Long. 118°25′ (82M/8W)
Between 1,600 and 3,000 feet elevation, on the east side of the Columbia River, 3 miles north of Mars Creek, 34 miles north of Revelstoke, on Highway 23.

Claims: ROBINA 1 to 22.

Access: By Highway 23 from Revelstoke, 34 miles.

Owner: NISSON MINING & DEVELOPMENT LTD., 626 West Pender Street, Vancouver 2.

Metals: Molybdenum, silver, copper, nickel, tungsten.

Work done: Road construction, 1½ miles; trenching, approximately 500 feet; stripping, approximately 2 acres; surface diamond drilling, 10 holes totalling 305 feet; percussion drilling, 27 holes totalling 128 feet.

REVELSTOKE

MOUNT COPELAND MINE (No. 45, Fig. K)

By E. Sadar

Location: Lat. 51°08′ Long. 118°29′ (82M/1W)
Fifteen miles northwest of Revelstoke.

Claims: Four hundred and forty-eight claims, comprising the KNOX, AA, AVA, XX, etc.

Access: Via 20 miles of gravel road, which leaves the Trans-Canada Highway 2 miles west of Revelstoke. About 4 miles of road is exposed to avalanche hazard.

Owner: King Resources Company.

Operator: KRC OPERATORS LTD., Box 1700, Revelstoke.

Metal: Molybdenum (*see* Table 1 for production).

Work done:

Underground development and stope preparation were continued on from the work done by a contractor in 1969. The service shaft was made operable with the installation of an electric hoist. The installation of diesel electric generators and stationary air compressors was completed by early March. Four 15-horsepower ventilating fans were installed at the North portal of the 6670 level.

Concentrator and crushing-plant facilities were completed at the end of February, and mill tune-ups commenced on March 3. Opening ceremonies were held on June 20, and production officially commenced on July 1.

Surface exploration parties based in the North Camp, on the north slope of Mount Copeland, worked through July, August, and September on further ore showings. Some of these were investigated down dip by diamond drilling.

Some improvements to the access road were also completed in 1970.

	Feet
Diamond drilling, underground	9,581
Diamond drilling, surface	1,175
Drifting and crosscutting	2,816
Subdrifting	1,515
Raising	1,873

At year-end the company employed 76 and contractors employed 8.

References: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 262; *B.C. Dept. of Mines & Pet. Res.*, G.E.M, 1969, p. 338.

NORTH LARDEAU

LB (LUCKY BOY) (No. 2, Fig. K)

By P. E. Olson

Location: Lat. 50°38.5′ Long. 117°36.2′ (82K/12E)

Three miles west of Trout Lake, at an elevation of 4,200 feet.

Claims: LB (Lot 5423), COPPER CHIEF (Lot 4584), HORSESHOE (Lot 5342), and many other Crown-granted and recorded claims.

Access: Via 4 miles of mining and logging-roads from the Trout Lake–Beaton road.

Owner: Alan Marlowe.

Operator: CASCADE MOLYBDENUM MINES LTD., 539 Eighth Avenue SW., Calgary 2, Alta.

Metal: Molybdenum.

Description: Molybdenite in quartz in granitic rocks adjacent to argillite and dolomite.

Work done: Surface geological mapping, 1 inch equals 400 feet on LB, Anex, CH, Copper Chief Moly, and Lucky Jay 6 claims; road construction, 2 miles; trenching, 5,000 feet on mapped claims; surface diamond drilling, seven holes totalling 3,256 feet on CH, Anex, Lucky Jay 1, and Copper Chief Moly claims.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 340.

TRUE FISSURE (No. 98, Fig. K)

By P. E. Olson

Location: Lat. 50°42.5′ Long. 117°30′ (82K/11W)

On Great Northern Mountain, about 2 miles north of Ferguson.

Claims: TRUE FISSURE (Lot 1097), HILLSIDE (Lot 1098), GREAT NORTHERN (Lot 1099), BROADVIEW (Lot 1550), and many more Crown-granted and recorded claims.

ACCESS: Via 3 miles of good mining-road from Ferguson.

OWNER: COLUMBIA METALS CORPORATION, LIMITED, 1002, 80 Richmond Street West, Toronto, Ont.; mine office, Trout Lake.

METALS: Silver, lead, zinc.

DESCRIPTION: While building access roads to the proposed pit area, the company reported the discovery of a new vein adjacent to the True Fissure lode.

WORK DONE: Surfacing of the lower section of the mine road was completed and minor improvements were effected to the remainder of this road. Plans to construct an underground crusher on the Morgan level were dropped, and a mill building was erected near the site of the old True Fissure mill which will house the mill equipment already on the property.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 341.

SILVER CUP (No. 73, Fig. K)

By P. E. Olson

LOCATION: Lat. 50°38′ Long. 117°22′ (82K/11W)
Near the head of Cup Creek, a tributary of Lardeau Creek, about 5 miles southeast of Ferguson.

CLAIMS: SILVER CUP (Lot 768), TOWSER (Lot 1565), and other claims.

ACCESS: Via mining-roads along Lardeau and Cup Creeks from Ferguson.

OWNER: SILVER DAWN MINES LTD., 203, 1033 West Pender Street, Vancouver 1.

METALS: Silver, lead, zinc.

WORK DONE: Access to the mine was improved and some new roads were built in the vicinity of the mine waste dumps. Subsequently, about 150 tons of dump rock was hauled from the mine and stockpiled at Silverton. The dump material was loaded into 20-ton-capacity scrapers which were hauled by tractor to the vicinity of Lardeau Creek. From this point the ore was transloaded into dump trucks and hauled to Silverton. The Silver Cup dumps have been largely removed by previous operators who left only low-grade material.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 341.

GOLDEN MINING DIVISION

CUMMINS RIVER

BEND (No. 106, Fig. K)

LOCATION: Lat. 52°03′ Long. 118°14′ (83D/1E)
Cummins River, 10 miles southeast of Boat Encampment.

CLAIMS: BEND, totalling eight.

ACCESS: By trail or helicopter from the Big Bend highway at the mouth of Cummins River.

OWNER: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

METALS: Silver, lead, zinc.

DESCRIPTION: A layer of banded, massive, and disseminated pyrite, sphalerite, and galena is exposed in the canyon of Cummins River. It is within a folded quartzite-dolomite-mica schist sequence which strikes northwest and dips steeply to the southwest.

WORK DONE: Three holes were diamond drilled from the bottom of the Cummins River Canyon which intersected the sulphide layer as much as 200 feet in elevation below the river.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 264.

MOOSE CREEK

WATERLOO (No. 25, Fig. K)

LOCATION: Lat. 51°11.5′ Long. 116°22.5′ (82N/1W)
At approximately 7,000 feet elevation, on Moose Creek, 15 miles southeast of Golden.

CLAIMS: WATERLOO 1 to 6, 9 to 14, RIVER 1 to 4.

ACCESS: By highway, logging-road, and helicopter from Golden, 30 miles (8-mile helicopter flight).

OWNER: PURCELL DEVELOPMENT CO. LTD., Brisco.

METALS: Lead, zinc, copper, silver, sodalite.

DESCRIPTION: Sulphide replacement in limestone and sodalite as veinlets in sedimentary rocks and disseminated in nepheline syenite.

WORK DONE: Hand-stripping and sampling on Waterloo 1, 2, 12, and 13; 1 ton sodalite-bearing rock shipped out by helicopter for evaluation purposes.

SPILLIMACHEEN

ADR (No. 30, Fig. K)

LOCATION: Lat. 50°55′ Long. 116°58′ (82K/15W)
At approximately 6,500 feet elevation, near the head of Vowell Creek, south of Golden.

CLAIMS: ADR 1 to 21.

ACCESS: By road from Parson, 35 miles.

OPERATOR: MEDESTO EXPLORATION LTD., 215A Tenth Street NW., Calgary, Alta.

METALS: Silver, lead.

DESCRIPTION: Two quartz fissure veins containing argentiferous galena, chalcopyrite, and malachite occur in sediments of the Horsethief Creek Group.

WORK DONE: Surface diamond drilling, one hole totalling 207 feet on ADR 13.

REFERENCE: *Minister of Mines, B.C.*, Ann. Rept., 1968, p. 265.

RUTH VERMONT MINE (No. 108, Fig. K)

By R. W. Lewis

LOCATION: Lat. 50°56.9′ Long. 116°58.9′ (82K/15W)
The Ruth Vermont mine is on the south side of Vermont Creek, 25 miles southwest of Golden.

CLAIMS: Company holdings include 36 mineral claims and seven mineral leases.

ACCESS: By approximately 37 miles of logging and mining-road from Parson via Vowell Creek.

OWNER: COPPERLINE MINES LTD., 400, 1055 West Hastings Street, Vancouver 1.

METALS: Silver, lead, zinc (*see* Table 1 for production).

DESCRIPTION: The sulphide mineralization currently being mined is contained in what is known as the Ruth syncline. Veins containing most of the sulphides occur in the footwall of the limestone and in the slate beneath the limestone. The geology of the property is covered in great detail in the *Annual Report of the Minister of Mines and Petroleum Resources for 1966*, on pages 230 to 235.

WORK DONE:

A mine camp with accommodation for about 70 persons was established, together with first aid facilities and provision of an ambulance.

A diesel-electric generating plant was installed with a capacity of 1,950 kva. and compressor capacity of 2,200 cfm. The milling plant, with a capacity of 600 tons per day, was completed, with milling commencing in September 1970. A three-pond tailings impoundment was dyked and a cyclone installed.

Ventilation capacity of 30,000 cfm was provided for the initial development on both the 5750 and 6000 levels, with provision for 60,000 cfm to be available for subsequent stoping operations.

A total of 1,773 feet of development was completed, which included the driving of the ore raise and the service raise from the 5750 level to the 6000 level. During the last three months of the year the mill worked to capacity, with ore being provided from the initial ramps being driven into the orebody above the 6000 level.

A trackless method has been adopted to work the deposit, with rubber-tired diesel-powered front-end loaders and a similar propelled drilling rig. The mined ore is transported out of the mine along the 5750 level to the ore bins in small cars hauled by a diesel-propelled locomotive. Concentrates from the mill are loaded and hauled by road to Kellog, Idaho, for smelting.

RED (No. 105, Fig. K)

LOCATION: Lat. 50°58.5' Long. 116°31' (82K/15E)
On the northeast slope of Jubilee Mountain, 2½ miles due west of Harrogate.

CLAIMS: RED.

ACCESS: By road from Harrogate.

OPERATOR: DRESSER INDUSTRIES, INC., 301, 415 Third Street SW., Calgary, Alta.

METALS: Silver, lead, zinc.

WORK DONE: A magnetometer survey and a geochemical soil survey for copper, lead, and zinc (140 samples) were made of part of the Red 3 and 4 claims.

REFERENCE: Assessment Report 2724.

BUGABOO CREEK

SILVER BASIN (No. 23, Fig. K)

LOCATION: Lat. 50°41.2' Long. 116°44.7' (82K/10E)
Bugaboo Pass, between elevations of 7,000 and 7,300 feet.

CLAIMS: WESTERN CROSS (Lot 1978), No. 21 (Lot 1977), and SILVER 1 to 22.

ACCESS: By road from Brisco, approximately 30 miles.

OWNER: PURCELL DEVELOPMENT CO. LTD., Brisco.

METALS: Silver, lead, zinc.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet on Western Cross and part of No. 21; magnetometer survey, approximately 2 line-miles covering Western Cross, No. 21, and part of Silver 1 and 2; road construction, approximately 6 miles from main Bugaboo road to claims; minor trenching and stripping on Western Cross and No. 21; surface diamond drilling, six holes totalling 2,000 feet on Western Cross and No. 21.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 342.

FORSTER CREEK

ANNETTE, SLIDE (No. 38, Fig. K)

LOCATION: Lat. 50°37′ Long. 116°28′ (82K/9W)
Between 4,800 and 9,000 feet elevation, near headwaters of Forster Creek, East Kootenay Valley.

CLAIMS: ANNETTE, SLIDE, BLUE, totalling 150.

ACCESS: From Radium Hot Springs by road, 23 miles.

OWNER: CANADIAN JOHNS-MANVILLE COMPANY LIMITED, Box 1500, Asbestos, P.Q.

METALS: Molybdenum, uranium, tungsten.

WORK DONE: Surface geological mapping (in part), 1 inch equals 1,000 feet; scintillometer survey; geochemical soil and talus fines survey, 235 samples; trenching, 10 feet.

REFERENCES: Assessment Reports 1254, 2603.

ATHALMER

WESCO, SWANSEA (No. 27, Fig. K)

LOCATION: Lat. 50°30′ Long. 115°56′ (82J/12W)
At approximately 4,150 feet elevation, 4 miles east of Athalmer.

CLAIMS: Twenty-seven, including WESCO, JUNIPER, ROSE, RIO claims held by record adjoining the Crown-granted claim SWANSEA (Lot 2576).

ACCESS: By forestry road from Highway 93/95, 3 miles.

OWNER: RIO ALTO EXPLORATION LTD., 1412, 727 Sixth Street SW., Calgary, Alta.

METALS: Copper, silver.

DESCRIPTION: Mineralized breccia zone in Jubilee dolomite.

WORK DONE: Claims and surface workings partially mapped; topography mapped; surface geological mapping, 1 inch equals 300 feet on Wesco 3; ground magnetometer survey, 2 line-miles covering Wesco 3; geochemical soil survey, approximately 500 samples covering Wesco 2 to 8, 15, 16, Juniper 1 to 4, and Rose 1 and 2.

REFERENCES: *B.C. Dept. of Mines,* Bull. 35, 1954, p. 65; Assessment Reports 2437, 2667.

HORSETHIEF CREEK

COPPER KING, IMPERIAL (No. 7, Fig. K)

LOCATION: Lat. 50°25′ Long. 116°29′ (82K/8W)
Between 7,000 and 8,500 feet elevation on the northwest slope of Black Diamond Mountain and the head of Farnham Creek, approximately 28 miles west of Invermere.

CLAIMS: Eighty-three claims, including COPPER KING (Lot 9988), IMPERIAL (Lot 9993), NORTH LIGHT (Lot 9994), IRON MASK (Lot 9991), BROKEN HILL (Lot 9992) Crown-granted claims held as a mineral lease (formerly Tatler group), and D, J, K, M, P claims held by record.

ACCESS: By truck road from Invermere, 38 miles.

OWNER: JUMBO MINES LTD., 617, 402 West Pender Street, Vancouver 3.

METALS: Copper, silver, lead, zinc, gold.

WORK DONE: Electromagnetic survey, 8 line-miles covering Iron Mask, Broken Hill, M 10, M 12, and parts of North Light, Imperial, Copper King, M 7 to 9, 14, 17, and P 2; trenching, 230 feet on North Light and K 25, 27, 29.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 343.

ALPHA (No. 90, Fig. K)

LOCATION: Lat. 50°25.5′ Long. 116°24′ (82K/8W)
Northeast slope of Delphine Creek, 21 miles west of Invermere.

CLAIMS: ALPHA 1 to 4 located claims adjacent to Crown-granted claims of the Delphine property.

ACCESS: By road from Invermere.

OPERATOR: RIO ALTO EXPLORATION LTD., 1412, 727 Sixth Street SW., Calgary, Alta.

METALS: Silver, lead, zinc.

WORK DONE: A geochemical survey of lead and copper in soil was made of an area between 6,000 and 7,500 feet on the east side of the north fork of Delphine Creek.

REFERENCE: Assessment Report 2502.

TOBY CREEK

MELODY (No. 40, Fig. K)

LOCATION: Lat. 50°19.5′ Long. 116°22.5′ (82K/8W)
Between 4,300 and 8,600 feet elevation, on Coppercrown Creek, south of Toby Creek.

CLAIMS: Eighty-five, MELODY, SILVER KING, COPPER CROWN.

ACCESS: From Mile 22 on the Toby Creek road by trail, 6 miles approximately.

OWNERS: CONUCO LIMITED, 212, 818 Eighth Avenue SW., Calgary 2, Alta., and NORTH CANADIAN OILS LIMITED, 640 Seventh Avenue SW., Calgary 2, Alta.

METALS: Silver, lead, zinc.

DESCRIPTION: Galena carrying silver occurs in veinlets and replacements of fractured, brecciated, dolomitic limestone.

WORK DONE: Topography and surface workings mapped; surface geological mapping; trail clearing; trenching, 341 feet on Melody 1, 3, and 4.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 343.

DUTCH CREEK

DUTCHY (No. 9, Fig. K)

LOCATION: Lat. 50°16′ Long. 116°23′ (82K/8W)
At approximately 6,400 to 7,200 feet elevation, at the headwaters of Copper Creek, a tributary of Dutch Creek, 20 miles west of Columbia Lake.

CLAIMS: DUTCHY 1 to 10.

ACCESS: By helicopter from Invermere, 28 miles.

OPERATOR: YORNOC MINING CO. LTD., Box 606, Invermere.

METAL: Copper.

WORK DONE: Electromagnetic survey, 1 line-mile on parts of Dutchy 3 to 6 claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 344.

SHELLY, CAROLE (No. 10, Fig. K)

Location: Lat. 50°19′ Long. 116°15′ (82K/8W)
At approximately 7,500 feet elevation, at the headwaters of Mineral Creek, 16 miles southwest of Invermere.

Claims: SHELLY, CAROLE.

Access: By helicopter from Invermere.

Owner: J. H. CONROY, Box 325, Invermere.

Metals: Lead, copper, barite.

Description: Quartz-barite veins containing galena and chalcopyrite are exposed in calcareous argillites transected by an andesite dyke.

Work done: Electromagnetic survey, approximately 3 line-miles on parts of the Carole 1 to 3 and 6 claims; gravity survey, one-half line-mile on the Shelly 14 to 16 claims; geochemical soil survey, 200 samples on the Carole 1 to 3 and 6 claims; trenching, 32 feet on the Carole 1 to 3 and 6 claims.

Reference: Assessment Report 2611.

YORNOC (No. 8, Fig. K)

Location: Lat. 50°19′ Long. 116°14′ (82K/8E)
At approximately 6,800 to 7,800 feet elevation, at the head of Ben Abel Creek, 16 miles southwest of Invermere.

Claims: YORNOC, about 40 recorded claims.

Access: By helicopter from Invermere, 20 miles.

Operator: DRESSER INDUSTRIES, INC., 301, 415 Third Street SW., Calgary 1, Alta.

Metals: Lead, silver, barite.

Work done: Gravity survey, approximately 3 line-miles on parts of Yornoc 18 to 20 and 22 claims; geochemical soil sampling on same claims.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 344.

FORT STEELE MINING DIVISION

SKOOKUMCHUCK

PRE (No. 17, Fig. K)

Location: Lat. 49°53–58′ Long. 115°39–42′ (82G/13E)
At approximately 3,500 feet elevation, 2½ miles east of Skookumchuck.

Claims: PRE, totalling 340.

Access: By road from Skookumchuck, 4 miles.

Owner: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

Metals: Lead, zinc, copper.

Description: Laminated to thin-bedded argillites and calcareous argillites of the Aldridge Formation contain disseminated pyrrhotite and lead, zinc, copper minerals, and pyrrhotite in fractures.

Work done: Surface geological mapping, 1 inch equals 200 feet on PRE 113 to 120; electromagnetic survey, 20 line-miles covering PRE 149 to 154; magnetometer survey, 20 line-miles covering PRE 109 to 118 and 61 to 67; gravity survey, 20 line-miles covering PRE 290 to 319; geochemical soil survey, approximately 700 samples covering same claims as geophysical work; road constructed, 2 miles; trenching, 70 feet on PRE 112; stripping, 1,400 square feet on PRE 112; surface diamond drilling, one hole totalling 601 feet on PRE 112.

References: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 344; Assessment Reports 2587, 2588.

WASA

LAZY (No. 19, Fig. K)

LOCATION: Lat. 49°48′ Long. 115°40′ (82G/13E)
At approximately 3,000 feet elevation, on Lazy Lake, 13 miles north of Fort Steele.

CLAIMS: LAZY 1 to 32.

ACCESS: By road from Cranbrook, 27 miles.

OWNER: TEXAS GULF SULPHUR COMPANY, 701, 1281 West Georgia Street, Vancouver 5.

METAL: Copper.

DESCRIPTION: Chalcopyrite occurs in veinlets and as disseminations in a quartzite host of Precambrian age.

WORK DONE: Surface geological survey, 1 inch equals 500 feet on Lazy 1 to 32; geochemical soil and silt survey, 100 samples covering Lazy 5 to 8, 15 to 20, 25, 27, 29, 31.

ESTELLA (No. 28, Fig. K)

LOCATION: Lat. 49°46.3′ Long. 115°36.2′ (82G/13E)
At approximately 6,200 feet elevation, 23 miles north of Cranbrook and 8 miles east of Wasa.

CLAIMS: Seventy-eight claims, including Crown-granted claims ESTELLA (Lot 6412), ROVER (Lot 6413), SKYLARK (Lot 6579), MORNING (Lot 6853).

ACCESS: By road from Wasa, approximately 12 miles.

OWNER: GIANT MASCOT MINES LIMITED, 1131 Melville Street, Vancouver 5.

METALS: Lead, zinc.

DESCRIPTION: Ore minerals, consisting of galena and sphalerite, with occasional pyrite and chalcopyrite, occur in a fracture zone striking northwest and dipping 48 degrees southwest. The zone extends through argillites of the Aldridge Formation and a diorite sill.

WORK DONE: Road construction, one-third mile; surface diamond drilling, three holes totalling 3,623 feet on Skylark, Rover, Morning, and Jenny.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1951, pp. 186–190; 1966, p. 241.

WILD HORSE RIVER

KOOTENAY KING (No. 18, Fig. K)

LOCATION: Lat. 49°43.5′ Long. 115°35.5′ (82G/12E)
At approximately 7,200 feet elevation, 7 miles north of Fort Steele at headwaters of Victoria Creek.

CLAIMS: Twenty claims, including KOOTENAY KING (Lot 7789), WATSON (Lot 7770) Crown-granted claims held as a mineral lease, and 18 held by record.

ACCESS: By road from Fort Steele, 7 miles.

OWNER: COMINCO LTD., Box 2000, Kimberley.

METALS: Lead, zinc, silver.

DESCRIPTION: Galena and sphalerite are localized along the hinge zone of an anticline in argillite of the Aldridge Formation.

WORK DONE: Surface geological mapping, 1 inch equals 100 feet and 1 inch equals 1,000 feet covering all claims; rehabilitation of old workings.

CEDAR (No. 24, Fig. K)

Location: Lat. 49°44′ Long. 115°29′ (82G/11W, 12E)
At approximately 5,000 feet elevation, on East Wild Horse River, 12 miles northeast of Fort Steele.

Claims: CEDAR 1 to 27.

Access: By logging-road from Fort Steele, 12 miles.

Operator: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

Metal: Tungsten.

Description: Disseminated scheelite occurs in tremolitic dolomite of the Precambrian Kitchener Formation.

Work done: Surface geological mapping, 1 inch equals 400 feet on Cedar 1 to 15 claims.

Reference: Assessment Report 2574.

KIMBERLEY

SULLIVAN MINE (No. 102, Fig. K)

By R. W. Lewis

Location: Lat. 49°42′ Long. 116°00′ (82F/9E)
The Sullivan mine and concentrator are located within the newly expanded limits of the city of Kimberley. The mine is located on Mark Creek, 2 miles north of the city centre, and the concentrator at Chapman Camp, 2 miles south of the city centre.

Claims: The holdings include 680 Crown-granted claims and fractions and 472 recorded claims.

Access: Off the main highway at Kimberley.

Owner: COMINCO LTD., 1199 West Pender Street, Vancouver 1; mine office, Trail.

Metals: Silver, lead, zinc (*see* Table 1 for production).

Work done:

During 1970, about 2,120,500 tons of Sullivan mine ore was treated at the concentrator. In addition, the concentrator treated approximately 74,200 tons of Pine Point ore. The concentrator operated 241 days.

Development driven totalled approximately 30,800 feet and core-hole diamond drilling about 12,300 feet. Backfill totalled 355,500 cubic yards of float, rock, and cave.

The ventilation system handled approximately 930,000 cubic feet per minute of air. The intake air-heating plants at No. 41 and No. 24 shafts operated from October 1969 to April 1970, with a combined output of 32 million B.T.U. per hour (natural gas). The amount of heated air was approximately 570,000 cubic feet per minute. A proposal for the heating of the No. 1 shaft intake air was completed for approval. Six-inch Fabrene fabric tubing was introduced during 1970 and found to be effective. Steel mill-hole covers were introduced in a number of sublevels and were found to be effective.

The application of rock mechanic techniques to improve mining methods continued throughout 1970.

Technical Development Department service was extended to all Cominco's mines in a programme directed toward improvement of mining methods. Trial and development of pneumatic stowing equipment continued with additional related investigation of its potential for such projects as placement of cemented fill, loading ships, and hoisting ore.

Investigation of improvements in explosives for underground use continued through the year and results were encouraging. Ammonium nitrate base slurry blasting agents with no conventional explosive ingredients have been developed which are cap sensitive, waterproof, comparable to conventional explosives in power, but safer and yield much less carbon monoxide and nitrous oxide fumes. Firm gels have been well regarded in secondary blasting tests. Pumpable gels are being advanced in small bore-hole trials.

Modifications in mine-car design are being introduced to improve car emptying and to reduce airborne dust ventilation problems stemming from cleaning accumulated muck out of cars.

Raise boring in rock with compressive strength up to 80,000 psi. was shown to be possible, but costly compared to conventional methods of driving raises.

Grouting of "float" backfill as a dilution control measure in pillar extraction was tried during the year.

Pollution control studies in conjunction with mine drainage were undertaken.

In 1970 there were 73 lost-time accidents at the Sullivan mine and 5 at the concentrator. Accident frequency per one million man-hours worked was 62.08 at the mine and 11.38 at the concentrator. The severity rate per one million man-hours worked was 2,055 calendar days at the mine and 442 at the concentrator. Thirteen Sullivan mine and concentrator employees obtained or renewed their industrial first aid certificates and 51 employees passed their St. John Ambulance first aid examinations. Twelve mine employees were successful in obtaining their mine-rescue certificates, making a total of 386 since training first started in 1929.

Employees at the year-end totalled 694 at the mine and 227 at the concentrator.

MARYSVILLE

RHO (No. 101, Fig. K)

LOCATION: Lat. 49°40′ Long. 115°55′ (82G/12W)
Two miles east of Chapman Camp and Marysville.

CLAIMS: Two Crown-granted claims and 20 adjoining located claims, RHO 6 to 14, 16 to 19, MAR 4 to 11.

ACCESS: By road from Marysville or Chapman Camp.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

WORK DONE: An electromagnetic survey totalling about 4 line-miles was run of the area of the Sullivan concentrator tailings pond.

REFERENCE: Assessment Report 2591.

MAR (No. 100, Fig. K)

LOCATION: Lat. 49°38.5′ Long. 115°58.6′ (82F/9E, 82G/12W)
Adjoining Marysville to the west.

CLAIMS: Thirty-one Crown-granted claims and eight adjoining MAR 1 to 3, 12 to 16 located claims.

ACCESS: By road from Marysville.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

WORK DONE: A magnetometer and electromagnetic survey was done of an area immediately west of Marysville. The survey was done along three east-west lines each about 2 miles long.

REFERENCE: Assessment Report 2590.

KIM (No. 29, Fig. K)

LOCATION: Lat. 49°39′ Long. 115°53′ (82G/12W)
At approximately 3,300 feet elevation, in Lone Pine Hill area, east of Marysville.

CLAIMS: KIM, totalling 171.

ACCESS: By road from Wycliffe, approximately 2 miles.

OWNER: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.

METALS: Lead, zinc.

WORK DONE: Electromagnetic survey, approximately 30 line-miles and geochemical soil survey, approximately 550 samples covering western portion of Kim claims.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 346; Assessment Report 2675.

WYE (No. 89, Fig. K)

LOCATION: Lat. 49°36.5′ Long. 115°49.5′ (82G/12W)
One and a half miles northeast of Wycliffe.

CLAIMS: WYE, totalling 10.

ACCESS: By road from Wycliffe.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

WORK DONE: Magnetometer, electromagnetic, and soil geochemical surveys for lead and zinc were made of an area about half a mile square on the Wye 41 to 46 claims.

REFERENCE: Assessment Report 2555.

MOYIE

DUD (No. 41, Fig. K)

LOCATION: Lat. 49°22.5′ Long. 116°07′ (82F/8E)
North Moyie Creek, near Ryder Creek, at elevation 5,000 feet.

CLAIMS: DUD 1 to 8.

ACCESS: From Cranbrook by road, 20 miles.

OWNER: IMPERIAL OIL ENTERPRISES LTD., 500 Sixth Avenue SW., Calgary 1, Alta.

METALS: Lead, copper.

WORK DONE: Geochemical soil survey, 125 samples covering Dud 1, 3, and 5.

HOPE (No. 26, Fig. K)

LOCATION: Lat. 49°20′ Long. 115°50′ (82G/5W)
At approximately 4,500 feet elevation, between Little Lamb Creek and Monroe Lake, 7 miles northwest of Moyie.

CLAIMS: HOPE, HELG, MXX (Fors property), 35 in all.

ACCESS: By logging-road from Highway 3, 4 miles.

OWNER: COMINCO LTD., Box 2000, Kimberley.

METALS: Lead, zinc.

DESCRIPTION: Galena and sphalerite form a lens in quartzites and argillites of the Aldridge Formation.

WORK DONE: Surface geological mapping, 1 inch equals 1,000 feet; road constructed one-quarter mile on Hope 8; surface diamond drilling, two holes totalling 1,224 feet on Hope 8.

REFERENCE: Assessment Report 834.

FORT STEELE

VICTOR (No. 16, Fig. K)

LOCATION: Lat. 49°36.7′ Long. 115°28.5′ (82G/11W)
At approximately 6,000 feet elevation, near the head of Maus Creek, 9 miles southeast of Fort Steele.

CLAIMS: VICTOR 1 to 8.

ACCESS: By road from Fort Steele, 10 miles.

OWNER: VICTOR MINING CORPORATION LTD., 818, 510 West Hastings Street, Vancouver 2.

METALS: Gold, silver, lead, zinc.

DESCRIPTION: Vertical quartz veins, striking south 15 degrees west, a few inches to 5 feet wide, in argillites contain galena, sphalerite, and pyrite.

WORK DONE: Underground workings mapped; trenching, 60 feet on Victor 3.

BULL RIVER

ALKI (No. 104, Fig. K)

LOCATION: Lat. 49°30.3′ Long. 115°29.5′ (82G/6W, 11W)
Twelve miles east of Cranbrook.

CLAIMS: ALKI, totalling 17.

ACCESS: Via 6 miles of road from Bull River.

OPERATOR: COMINCO LTD., 1155 West Georgia Street, Vancouver 5.

WORK DONE: Magnetometer, electromagnetic, and lead-zinc soil geochemical surveys were run of an area about 1 mile square immediately south of Alkaline Lake.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 348; Assessment Report 2556.

BULL RIVER MINE (No. 103, Fig. K)

By R. W. Lewis

LOCATION: Lat. 49°30′ Long. 115°23′ (82G/11W)
The Bull River mine is at an elevation of about 3,500 feet on Burntbridge Creek north of the Bull River road, some 5 miles due north of Wardner.

CLAIMS: The company holdings include 106 full and 12 fractional claims.

ACCESS: Off Highway 3 at Wardner, 8 miles.

OWNER: PLACID OIL COMPANY, 860 Guiness House, 727 Seventh Avenue SW., Calgary, Alta.

METALS: Silver, copper, gold.

DESCRIPTION:

The Bull River mine is scheduled for production in the summer of 1971. Feasibility studies were completed in May 1970 and shortly afterward construction of the plant-site was commenced and continued to the end of the year.

A 750-tons-per-day plant is being constructed to process the copper-silver-gold ore. Mining will be by open-pit methods, with the milling being done by simple crushing, grinding, and flotation circuits.

The geology of the deposit consists of a vein-type quartz-siderite gangue containing massive and fracture-filling chalcopyrite.

WORK DONE:

Approximately 3 miles of road into the property was resurveyed and brought up to highway standards. An 80-man construction camp was erected. The plant-site was selected and levelled. Concrete foundations for the plant buildings were

30 per cent completed. Power-lines and freshwater-lines for the plant services were installed but not connected.

Work was approximately 35 per cent completed on the tailings dam area, with 100,000 cubic yards of overburden removed and highly compacted to conform with Provincial pollution standards.

A 55,000-cubic-yard reclamation berm was completed above the No. 2 pit footwall in preparation for the reclamation programme.

Preliminary pit roads were completed, along with the necessary grubbing requirements.

To further investigate subsurface mineralization at the Bull River property, Placid Oil Company, through the contract diamond-drilling firm of Sheppard Enterprises, undertook 19,364 feet of AXT rotary diamond drilling. The programme extended from April to November, employing two B-18 wireline rigs. A temporary camp comprising three trailers housed eight to twelve men.

FLATHEAD

MIKE, GOOF (No. 22, Fig. K)

LOCATION: Lat. 49°21′ Long. 114°34′ (82G/7E)
Between 5,500 and 7,500 feet elevation, east of Flathead and south of North Kootenay Pass.

CLAIMS: MIKE, GOOF, 70 in all.

ACCESS: By road from Natal, approximately 30 miles.

OWNER: ALCOR MINERALS LTD., 401 Northgate Building, Edmonton, Alta.

METAL: Copper.

DESCRIPTION: Stratabound chalcocite, chalcopyrite, and bornite found in quartzite of Grinnell Formation. Copper mineralization also occurs in diorite sills.

WORK DONE: Geochemical stream sediment survey, 62 samples covering all claims.

COMMERCE CREEK

COMMERCE (No. 32, Fig. K)

LOCATION: Lat. 49°10–11′ Long. 114°20–25′ (82G/1W)
Between 6,000 and 7,500 feet elevation, on Commerce Creek, Flathead Valley.

CLAIMS: COMMERCE 1 to 16, 19 to 39, 41 to 48.

ACCESS: By road and helicopter from Fernie, 50 miles.

OPERATOR: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

METAL: Copper.

DESCRIPTION: Stratabound copper in quartzites of the Grinnell Formation.

WORK DONE: Surface diamond drilling, five holes totalling 250 feet on Commerce 9, 10, and 14.

TRI, SAM, TOP, LION (No. 20, Fig. K)

LOCATION: Lat. 49°10′ Long. 114°23′ (82G/1W)
Between 4,500 and 8,000 feet elevation on Commerce Peak, east of Flathead River.

CLAIMS: TRI, SAM, TOP, LION, BOY, HANK, JIM, totalling 99.

ACCESS: By road from Natal, approximately 50 miles.

OWNER: ALCOR MINERALS LTD., 401 Northgate Building, Edmonton, Alta.

Metal: Copper.

Description: Stratabound chalcocite, chalcopyrite, and bornite found in quartzite of Grinnell Formation. Copper mineralization also occurs in quartz veins and Purcell andesite.

Work done: Geochemical stream sediment survey, 133 samples covering all claims.

Reference: *Minister of Mines, B.C.*, Ann. Rept., 1967, p. 272.

LA COULOTTE RIDGE

STANG, PAUL (No. 21, Fig. K)

Location: Lat. 49°10′ Long. 114°17′ (82G/1W)
Between 6,500 and 7,000 feet elevation on La Coulotte Ridge, east of the Flathead River.

Claims: STANG and PAUL, totalling 12.

Access: By road from Natal, approximately 55 miles.

Owner: ALCOR MINERALS LTD., 401 Northgate Building, Edmonton, Alta.

Metal: Copper.

Description: Stratabound chalcopyrite, bornite, and chalcocite found in quartzite of Kintla Formation. Copper mineralization also occurs in diorite sills.

Work done: Geochemical stream sediment survey, 36 samples covering all claims.

KISHINENA CREEK

LIN (No. 33, Fig. K)

Location: Lat. 49°02–04′ Long. 114°16–18′ (82G/1W)
Between 4,500 and 9,000 feet elevation, on Kishinena Creek, Flathead Valley.

Claims: LIN 1 to 26.

Access: By road from Fernie, 70 miles.

Operator: FALCONBRIDGE NICKEL MINES LIMITED, 500, 1112 West Pender Street, Vancouver 1.

Metal: Copper.

Description: Stratabound copper in quartzites of the Grinnell Formation.

Work done: Surface geological mapping, 1 inch equals 10,000 feet covering all claims.

Reference: Assessment Report 2703.

TABLE 1—METAL PRODUCTION, 1970

Property or Mine	Location of Mine	See Page	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Contents					
						Gold	Silver	Copper	Lead	Zinc	Cadmium
Alberni Mining Division				Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Brynnor mine	Kennedy Lake		Brynnor Mines Ltd. (Kennedy Lake Division)	4,296	Iron concentrates shipped from stockpile						
Lynx mine	Buttle Lake	284	Western Mines Ltd.	386,976	Copper concentrates, 27,664 tons; lead concentrates, 733 tons; zinc concentrates, 38,038 tons	11,795	391,669	14,004,960	4,929,563	46,343,518	198,640
Atlin Mining Division											
Nil											
Cariboo Mining Division											
Boss Mountain mine	Big Timothy Mountain	210	Brynnor Mines Ltd. (Boss Mountain Division)	591,168	Molybdenite concentrates, 1,982 tons containing 2,247,135 lb. of molybdenum						
	Black Bear Creek		A. Lagace, Likely	½	Crude ore		37		301	3	
Clinton Mining Division											
Nil											
Fort Steele Mining Division											
Sullivan mine	Kimberley	473	Cominco Ltd.	2,120,529	Lead concentrates, 134,523 tons; zinc concentrates, 161,160 tons; tin concentrates, 253 tons containing 263,716 lb. of tin; iron sinter, 186,207 tons	161	2,887,544	522,800	191,608,800	166,449,000	448,658
Golden Mining Division											
Ruth Vermont	Parson	457	Copperline Mines Ltd.	36,227	Lead concentrates, 1,382 tons; zinc concentrates, 2,198 tons	49	124,915		1,758,818	2,367,296	16,686
Greenwood Mining Division											
Doorn	Beaverdell		Argentia Mines Ltd.	10	Crude ore	21	78		20	20	
Highland Bell mine	Beaverdell	409	Leitch Mines Ltd.	33,225	Lead concentrates, 2,077 tons; zinc concentrates, 444 tons; jig concentrates, 126 tons	539	444,269		593,387	592,903	2,938
Greyhound, Mother Lode	Greenwood	429	Greyhound Mines Ltd.	202,631	Copper concentrates, 2,599 tons	410	9,331	1,107,894			
Phoenix mine	Phoenix	428	The Granby Mining Co. Ltd. (Phoenix Copper Division)	862,156	Copper concentrates, 22,361 tons	12,201	135,863	11,350,131			
Kamloops Mining Division											
Bethlehem mine	Highland Valley	331	Bethlehem Copper Corp. Ltd.	5,450,746	Copper concentrates, 81,370 tons	2,251	183,292	51,651,084			

TABLE 1—METAL PRODUCTION, 1970—*Continued*

Property or Mine	Location of Mine	See Page	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Contents					
						Gold	Silver	Copper	Lead	Zinc	Cadmium
				Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Liard Mining Division											
Magnum mine	Delano Creek	43	Churchill Copper Corp. Ltd.	170,581	Copper concentrates, 14,356 tons			8,737,350			
Rich	Cassiar		B. Wiseman, Cassiar	6	Crude ore		450		5,567	1,088	
Lillooet Mining Division											
Bralorne mine	Bralorne	225	Bralorne Can-Fer Resources Ltd.	76,817	Bullion	39,300	6,813				
Nanaimo Mining Division											
Old Sport mine	Benson Lake	273	Coast Copper Co. Ltd.	290,911	Copper concentrates, 21,410 tons; iron concentrates, 78,465 tons	7,279	48,882	10,208,800			
Texada mine	Texada Island	282	Texada Mines Ltd.	1,347,225	Iron concentrates, 497,639 tons; copper concentrates, 9,011 tons	1,464	55,109	3,688,249			
Nelson Mining Division											
Annex	Nelway	444	Reeves MacDonald Mines Ltd.	70,565	Lead concentrates, 1,244 tons; zinc concentrates, 11,821 tons		198,283	9,444	1,294,158	12,058,224	150,207
Burlington (Sheep Creek Camp)	Salmo	441, 442	J. A. C. Ross, Vancouver	1,472	Siliceous ore	69	421		7,938	9,441	
Edward VIII (Sheep Creek Camp)	Salmo	441, 442	J. A. C. Ross, Vancouver	281	Siliceous ore	4	42		1,273	1,684	
Howard	Salmo	440	John Stoochnoff, Salmo	31	Crude ore	1	9		310	186	
Jersey mine	Salmo, Iron Mountain	442	Canadian Exploration Ltd.	213,026	Lead concentrates, 3,244 tons; zinc concentrates, 9,023 tons		18,856		4,893,834	10,672,948	83,449
Malwaaz (Sheep Creek Camp)	Salmo	441, 442	J. A. C. Ross and associates, Vancouver	198	Siliceous ore	4	27		541	831	
New Arlington	Salmo, Erie Creek	441	G. D. Fox, Trail	1,103	Crude ore	85	1,073		18,380	11,764	
Queen (Sheep Creek Camp)	Salmo	441, 442	J. A. C. Ross, Vancouver	357	Siliceous ore	10	43		715	989	
Reeves MacDonald mine	Nelway	444	Reeves MacDonald Mines Ltd.	107,312	Lead concentrates, 2,482 tons; zinc concentrates, 8,707 tons		20,038	6,774	2,674,042	9,432,733	55,650
Reno (Sheep Creek Camp)	Salmo	441, 442	Ronald Endersby and associate, Fruitvale	3,024	Siliceous ore	541	640		9,948	13,008	
Silver Dollar	Salmo, Erie Creek	441	D. H. Norcross, Nelson	429	Crude ore	38	1,557		4,249	6,027	
Yellowstone (Sheep Creek Camp)	Salmo	441, 442	F. R. Rotter, Salmo	66	Siliceous ore	3	7		398	265	
Ymir	Ymir	440	Silver Dawn Mines Ltd.	604	Crude ore	39	277		2,005	14,850	
Yosemite (Sheep Creek Camp)	Salmo	441, 442	F. R. Rotter, Salmo	1,934	Siliceous ore	149	366		10,233	7,523	
New Westminster Mining Division											
Pride of Emory mine	Hope	248	Giant Mascot Mines Ltd.	213,228	Nickel-copper concentrates, 18,950 tons; nickel content, 3,872,958 lb.			2,202,152			

Nicola Mining Division											
Craigmont mine	Merritt	373	Craigmont Mines Ltd.	1,797,213	Copper concentrates, 60,522 tons; iron concentrates, 18,565 tons			34,110,361			
Omineca Mining Division											
Cronin mine	Smithers	164	Kindrat Mines Ltd.	1,746	Lead concentrates, 87 tons; zinc concentrates, 104 tons	27	11,800		111,351	117,382	1,432
Endako mine	Endako	114	Endako Mines Ltd.	10,118,000	Molybdenite concentrates, 8,225 tons; molybdenum trioxide, 5,857 tons; ferromolybdenum, 214 tons. Total content, 15,565,807 lb. of molybdenum						
Granisle mine	Babine Lake	165	Granisle Copper Ltd.	2,393,161	Copper concentrates, 33,862 tons	11,113	105,274	22,791,847			
Pinchi Lake mine	Pinchi Lake	117	Cominco Ltd.	(1)	Mercury						
Reiseter	Smithers	162	A. Mesich, Smithers	21	Hand-sorted stibnite containing 13,893 lb. of antimony						
Silver Standard mine	Hazelton	—	Northwestern Midland Development Co. Ltd.	486	Lead concentrates, 21 tons; zinc concentrates, 21 tons	17	8,456	1,200	14,332	22,014	271
Sunrise	Hazelton	175	Sunrise Silver Mines Ltd.	24	Crude ore		522		2,404	3,942	
Osoyoos Mining Division											
Brenda mine	Brenda Lake	391	Brenda Mines Ltd.	7,326,559	Copper concentrates, 61,125 tons; molybdenite concentrates, 5,660 tons containing 6,394,520 lb. of molybdenum	2,931	201,549	25,896,705			
Golconda	Olalla	395	Trent Resources Ltd.	(2)							
Horn Silver mine	Keremeos	394	Utica Mines Ltd.	18,790	Silver concentrates, 763 tons	320	130,274		24,863	20,703	
Revelstoke Mining Division											
Mount Copeland mine	Revelstoke	464	King Resources Co.	54,305	Molybdenite concentrates, 548 tons containing 637,104 lb. of molybdenum						
Similkameen Mining Division											
Nil											
Skeena Mining Division											
British Columbia Molybdenum mine	Alice Arm	94	British Columbia Molybdenum Ltd.	2,693,228	Molybdenite concentrates, 4,894 tons containing 5,867,377 lb. of molybdenum						
Granduc mine	Stewart	68	Granduc Operating Co.	105,230							
Tasu mine	Tasu Harbour	101	Wesfrob Mines Ltd.	2,275,294	Iron concentrates, 1,093,893 tons; copper concentrates, 48,407 tons	7,172	249,959	19,048,820			

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[1] Details confidential.

[2] Not available.

TABLE 1—METAL PRODUCTION, 1970—*Continued*

Property or Mine	Location of Mine	See Page	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Contents					
						Gold	Silver	Copper	Lead	Zinc	Cadmium
Slocan Mining Division				Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Arlington	Springer Creek	448	Arlington Silver Mines Ltd.	2,792	Crude ore		34,145		140,076	93,071	
Black Prince	Slocan	447	Delmar Hannem, Calgary	11	Crude ore		61		1,310	589	
Bluebell mine	Riondel	460	Cominco Ltd.	246,529	Lead concentrates, 14,978 tons; zinc concentrates, 24,847 tons	81	308,583	311,000	21,006,000	25,369,800	112,030
Bruce	Lavina Mountain	462	Wayne Turley & Associate, Kaslo	5	Crude ore		178		6,115	113	
Comstock	Silverton	450	R. H. Murphy, Nakusp	32	Clean-up		24		9	9	
Hewitt	Silverton	450	Surfside Explorations Ltd.	2,243	Lead concentrates, 115 tons; zinc concentrates, 221 tons	3	33,343		149,120	250,760	1,796
Homestake	Slocan City	449	C. Thickett, Slocan	259	Crude ore	140	15,958				
Isle	Kaslo	462	R. Handley & Associates, Kaslo	2	Crude ore		1		27	17	
Ottawa mine	Springer Creek	448	Pamicon Developments Ltd.	126	Crude ore		19,305		1,572	1,244	
Panama	New Denver	457	T. I. Steenhoff, New Denver	10	Crude ore		571				
Pontiac	Ainsworth		W. Matheson and H. Lind, Nelson	16	Crude ore	5	222		4,211	7,040	
Scranton	Kaslo	459	Silver Star Mines Ltd.	3,302	Lead concentrates, 180 tons; zinc concentrates, 202 tons	370	9,781	417	262,100	235,699	
Silmonac	Sandon	452	Kam-Kotia and Burkam Joint Venture	13,232	Lead concentrates, 1,384 tons; zinc concentrates, 1,345 tons		245,976		1,855,073	1,678,118	11,676
Silver Hoard	Ainsworth	460	R. B. Strong, Winlaw	42	Crude ore		728		1,786	4,916	
Victor	Sandon	453	E. Perepolkin and Associates, Sandon	11	Crude ore	1	1,174		8,805	746	
Washington	Retallack–Three Forks	455	Red Deer Valley Coal Co. Ltd.	807[3]	Lead concentrates, 29 tons; zinc concentrates, 151 tons	1	4,698		36,404	168,171	1,295
Winona	Retallack	456	Hilroy Mines Ltd.	5	Crude ore		22		516	569	
Trail Creek Mining Division											
Coxey mine	Rossland	436	Red Mountain Mines Ltd.	212,051	Molybdenite concentrates, 471 tons containing 564,554 lb. of molybdenum						
IXL	Rossland		J. A. and M. M. Ruelle, Rossland		High-grade ore	42	4				
Vancouver Mining Division											
Britannia mine	Howe Sound	233	Anaconda Britannia Mines, Division of Anaconda American Brass Ltd.	319,262	Copper concentrates, 9,307 tons; zinc concentrates, 288 tons	548	21,612	5,505,068		273,508	1,285
Callaghan	Alta Lake	230	Barkley Valley Mines Ltd.	90	Crude ore	5	373	3,645	17,780		
Vernon Mining Division											
Nil											
Victoria Mining Division											
Nil											

[3] Estimate.

CHAPTER 3

Placer

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GENERAL REVIEW OF PLACER MINING

The annual value of placer gold production in the Province has been declining since the record of $3.9 million in 1863, which was shortly after the discovery of the Cariboo placers. During the more than 100-year interval there were several lesser peak production years, in 1875, when the Cassiar placers were at their height, in 1899, when the Atlin placers were most productive, and in 1938, when the revaluation of gold had its maximum effect. In 1970, sales of placer gold to the Mint amounted to $11,989, of which less than half represents gold actually mined in the Province during the year. The almost complete exploitation of known placer occurrences, the lack of new discoveries, and the constantly increasing costs of operation have had their inevitable result in the almost complete extinction of placer gold production in the Province.

Nevertheless, some of the old-fashioned gold lure must still exist, for some individuals and companies still persist with exploratory programmes and production operations.

REPORTS ON PLACER OPERATIONS

ATLIN MINING DIVISION

Placer-mining in the vicinity of Atlin continues to decline. Work was done by two men on a lease owned by F. La Roche on Spruce Creek, by Karl Sieger on Pine Creek, by Luigi Piccolo and A. Vesnaver on McKee Creek, and by C. Guyette on Birch Creek.

LIARD MINING DIVISION

The Colorado Corporation, on a large number of leases held by Brycon Explorations Ltd., did about 100,000 lineal feet of trenching, put down 23 churn-drill holes totalling 2,751 feet, ran seismic surveys along 30 miles of line, and built 32 miles of road. This extensive programme of testing did not discover workable placer gravel and the option on the leases was relinquished.

Katanga Mines Ltd. held five placer leases on Letain Creek, 3 to 5 miles west of Wolverine Lake; 2,062 cubic feet of trenching was done on Placer-mining Lease 1020, the westernmost of the five.

L. Meyer operated a small dredge on Placer-mining Lease 780 on McDame Creek.

CARIBOO MINING DIVISION

The following work was done:

The Ogden mine on the north side of Cedar Creek was operated by R. Hampton, of Likely. Approximately 35,000 cubic yards of overburden was removed and 30,000 cubic yards of gravel was washed.

Consolidated Vigor Mines Ltd. tested the Hannandor placer leases on Lightning Creek downstream from the junction of Angus Creek and 23 miles east of Quesnel.

T. M. Hannah worked his lease on California Gulch.

R. J. Miller, R. Whittle, and J. Uhrich were hand-mining for part of the year. All reported that small amounts of gold were recovered.

T. G. Crawford continued working his placer lease on Lightning Creek, upstream from Stanley.

R. Bourelle was testing his Placer-mining Lease 6688 on the Cottonwood River, 22 miles east of Quesnel.

E. F. Lang and G. Stengl worked Lang's placer lease on Keithley Creek.

CLINTON MINING DIVISION

Fairborn Mines Ltd. holds 12 placer-mining leases on Fairless and Borin Creeks, at about elevation 5,000 feet on the west side of Black Dome Mountain. About 1,000 lineal feet of bulldozer trenching and about 5 acres of stripping were done on Placer-mining Leases 451 and 452.

LILLOOET MINING DIVISION

Rainbow Lake Explorations Ltd. sank 20 test pits on their leases on Manson Bar on the Fraser River, 1 mile from Lillooet.

NEW WESTMINSTER MINING DIVISION

Zyrox Mining Company Ltd. holds 14 placer-mining leases at the head of Harrison Lake, 40 miles by boat from Harrison. Thirty pits were sunk and bulk samples taken for testing.

Platinate Minerals and Industries Ltd. holds 58 placer-mining leases extending along the Harrison River from the head of Harrison Lake to the mouth of Snowcap Creek. One hundred pits were sunk and bulk samples taken for testing.

FORT STEELE MINING DIVISION

Maus Minerals Ltd. holds Placer-mining Leases 732, 733, and 945 on Maus Creek, 5 miles northeast of Fort Steele. From the bottom of the shaft on Placer-mining Lease 733 the drift was continued for an additional 15 feet in an easterly direction on and in the bedrock.

CHAPTER 4

Structural Materials and Industrial Minerals

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GENERAL REVIEW OF STRUCTURAL MATERIALS AND INDUSTRIAL MINERALS

During 1970, in addition to normal operations, several deposits of different materials were investigated, one processing plant was expanded, and three new plants began operating.

Cassiar Asbestos Corporation Limited made additions to the plant at Cassiar which will increase the annual fibre production to 100,000 tons. The company also did a considerable amount of exploration work on the Kutcho Creek (Letain) asbestos property. Other companies examined deposits southeast of Dease Lake and southwest of Lytton.

Barite was produced as usual at Parson, Spillimacheen, and Brisco. A new plant to recover barite from the tailings at the old Mineral King mine went into operation on Toby Creek.

There was little change in the building-stone sector. International Marble & Stone Ltd. mined most of their dolomite underground during the year. A marble deposit on Knight Inlet and a quartzite deposit at Kakwal Lake in northeastern British Columbia were investigated.

Although cement production at Bamberton and Lulu Island was down, Canada Cement Lafarge Ltd. put their new plant at Kamloops on stream during the summer.

At Quesnel, Crownite Industrial Minerals Ltd. began running-in trials with their new processing plant. Some diatomite was treated and some shale was processed to make pozzolan.

The jade miners were busy with eight operators reporting production.

All limestone producers were active. A new quarry was opened at Kamloops to provide stone for the cement plant. A large limestone deposit near Jesmond received some attention.

Northeast of Radium a company examined a large magnesite deposit.

Most sand and gravel producers were fairly active despite the construction industry troubles.

REPORTS ON COMMODITIES

ASBESTOS

BLUE, GREEN, WHITE

MINING DIVISION: Kamloops.

LOCATION: Lat. 50°09′ Long. 121°50′ (92I/4W)
Three and one-half miles southeast of Skihist Mountain and 12½ miles west-southwest of Lytton.

CLAIMS: BLUE, GREEN, WHITE.

ACCESS: Pack-trail from Kanaka or helicopter.

OPERATOR: MAGNETRON MINING LTD., 2020, 777 Hornby Street, Vancouver 1.

DESCRIPTION: Small patches of amphibole asbestos occur in serpentine associated with sedimentary rocks.

WORK DONE: Reconnaissance geological survey.

REFERENCE: Assessment Report 2536.

KUTCHO CREEK ASBESTOS

MINING DIVISION: Liard.

LOCATION: Lat. 58°20′ Long. 128°44′ (104I/7E)
About 2½ miles northeast of Letain Lake, at 6,000 feet elevation.

CLAIMS: Twenty-eight Crown-granted claims (A, BOB, RIB, RIDGE, REX, TENT, TON) and 282 recorded claims (B, N, JOE, BILL, MATT, BELL, F, WHI).

ACCESS: By float plane east from Dease Lake, 46 miles.

OWNER: Kutcho Creek Asbestos Company Limited.

OPERATOR: CASSIAR ASBESTOS CORPORATION LIMITED, Cassiar.

DESCRIPTION: Cross-fibre chrysotile asbestos in serpentinized peridotite.

WORK DONE: Claims and surface workings mapped; 9.5 miles of road constructed; 17,445 feet of trenching on Matt 6 and 8, Joe 50 to 52, 141, Bell 14 and 16, B 11, and Rib 1, 3, and 5; drillsites and portal site prepared.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1966, p. 260; Assessment Reports 1075, 1076.

JAY

Mining division: Liard.

Location: Lat. 58°42′ Long. 129°52.5′ (104I/12W)
At 3,875 feet elevation, on east shore near south end of small unnamed lake containing island, 11 miles southeast of north end of Dease Lake.

Claims: JAY 11 to 14.

Access: By helicopter, 10 miles from Dease Lake.

Owner: TOURNIGAN MINING EXPLORATIONS LTD., Box 3859, Vancouver 9.

Description: Chrysotile fibre in serpentine.

Work done: Approximately 1½ line-miles of magnetometer survey on Jay 11 to 14.

CASSIAR MINE

By A. D. Tidsbury

Mining division: Liard.

Location: Lat. 59°19.6′ Long. 129°49.4′ (104P/5W)
Between 5,870 and 7,000 feet elevation on Mount McDame, 3 miles north of Cassiar.

Claims: Forty-two Crown-granted and five leased.

Access: By gravel road, 86 miles from Mile 648.8, Alaska highway. The mine is 7 miles by road from Cassiar.

Owner: CASSIAR ASBESTOS CORPORATION LIMITED, 1001, 85 Richmond Street West, Toronto, Ont.; mine office, Cassiar.

Work done: A large, new mill extension was started, 10 GIC houses were erected to house construction personnel, and a 20-foot bay extension was added to the powerhouse. Two diesel-driven generators of 500 kva. each were removed and one diesel-driven generator of 1,750 kva. was installed. An extensive programme of upgrading and extending the townsite and facilities was begun. Total power generated, 22,464,500 kwh. and 67,556,000 pounds of steam. Production: 85,871.45 tons of fibre was produced from 689,388 tons of ore milled; 4,150,885 tons of waste was removed and 917,633 tons of ore was mined.

References: *Minister of Mines, B.C.,* Ann. Repts., 1953 to 1968; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 379.

BARITE

LUCKY (CAMERON)

By J. W. McCammon

Mining division: Golden.

Location: Lat. 50°25.9′ Long. 115°52.9′ (82J/5W)
At about 3,800 feet elevation, near the centre of the north boundary of SL 124, 1¼ miles north of Madias Creek and 5 miles southeast of Windermere.

Claims: LUCKY; LUCKY Nos. 2, 3, 4.

Access: By rough road, 1¾ miles east and north from a point on the old valley highway, 5.3 miles south of its junction with Highway 95 at Windermere.

Description:

At this prospect, irregular angular patches of barite occur in dolomite of the Cambrian Jubilee Formation.

A small quarry has been opened up on a steep, west-sloping, lightly wooded sidehill. Outcrops are moderately abundant and overburden appears thin.

The host rock is medium- to fine-grained, light-grey, vuggy dolomite that weathers light grey. It is highly jointed by multidirectional fractures that cause it to break into 1 to 3-inch cubes. In the vicinity of the quarry some brecciation is present. Bedding planes strike between north 65 and 70 degrees east and dip 20 to 30 degrees south.

The barite replaces patches of dolomite, fills angular spaces between dolomite fragments, and forms short irregular veinlets. The distribution of the mineralization in the quarry as seen in 1970 is illustrated on Figure 70. Spotty, small patches of barite are visible in the dolomite for 200 feet north and for 100 feet south of the quarry. No sizeable continuous masses of barite are exposed. Much of the barite is coarse grained with well-developed cleavage and the rest is fine grained. Stringers of quartz accompany the barite. Traces of galena and copper mineralization have been reported. Iron stain discolours some of the barite, but most of it is white.

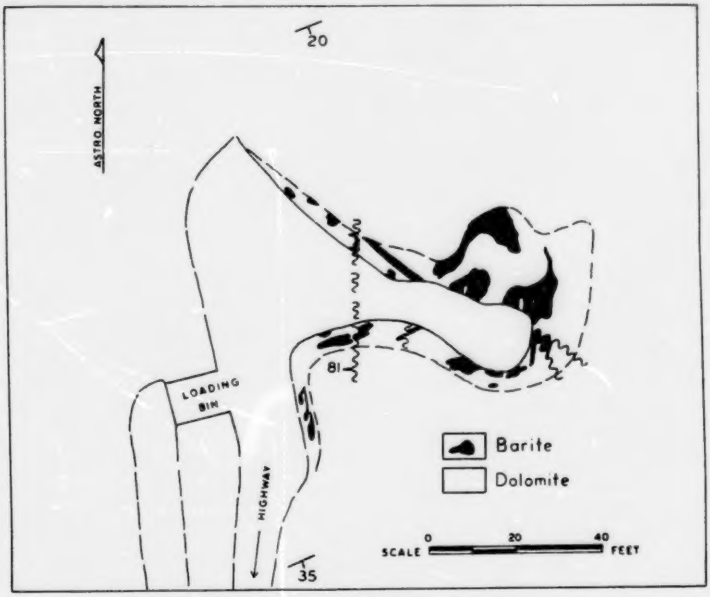

Figure 70. Lucky barite quarry.

Work done:

Claims on this barite occurrence were recorded in 1952 and 1953 by the late Thomas Cameron, of Windermere. Magnet Cove Barium Corporation optioned the claims in 1953–54 and did some exploration work. In 1956, Millwhite Mud Services optioned the property, built half a mile of road, and did some stripping. Elkhorn Mining Co. Ltd. optioned the claims in 1961, opened a quarry, and made a small shipment from it. No other activity has been recorded. In July 1970, the quarry opening was as shown on Figure 70. The maximum face height at the east end was about 35 feet.

References: *B.C. Dept. of Mines,* Bull. 35, 1954, p. 64; *Minister of Mines, B.C.,* Ann. Repts., 1956, p. 149; 1961, p. 141.

YORNOC

Mining division: Golden.

Location: Lat. 50°19′ Long. 116°14′ (82K/8E)

See report under this name, page 471.

TOBY CREEK BARITE

Mining division: Golden.

Location: Lat. 50°21′ Long. 116°24.4′ (82K/8W)
Near southwest corner of Lot 16154 on Toby Creek at the mouth of Jumbo Creek, 20 miles southwest of Invermere.

Access: By road up the north side of Toby Creek from Wilmer.

Owner: MOUNTAIN MINERALS LIMITED, Box 700, 529 Sixth Street South, Lethbridge, Alta.

Work done: The plant to recover barite from the old tailings pond of the closed Mineral King mine was completed and put into operation in July. Barite concentrate amounting to 9,546 tons was produced and hauled by truck to the railway at Athalmer for shipment to the company processing plant at Lethbridge.

SHELLY, CAROLE

Mining division: Golden.

Location: Lat. 50°19′ Long. 116°15′ (82K/8W)
See report under this name, page 471.

BAROID OF CANADA

Mining division: Golden.

Location: Lat. 50°56′ Long. 116°29′ (82K/16W)
At 3,100 feet elevation, on the west side of Jubilee Mountain, 5½ miles northwest of Spillimacheen.

Claims: Former Silver Giant mine property.

Access: By road, 8 miles northwest from Spillimacheen.

Owner: BAROID OF CANADA, LTD., 44 King Street West, Toronto, Ont.

Work done: The company recovered 19,338 tons of barite concentrate from the tailings of the former Silver Giant mine and hauled the concentrate by truck to a car-loading station at Spillimacheen. A total of 1,308 manshifts was worked in the summer months and no accidents were reported at the property.

BRISCO BARITE

Mining division: Golden.

Location: Lat. 50°49.8′ Long. 116°19.5′ (82K/16W)
Between Templeton River and Dunbar Creek, 2½ miles west of Brisco.

Claims: WAMINECA (Lot 15044), CANYON (Lot 15045), SALMON (Lot 15046), CARMINE (Lot 15047), NORTHISLE (Lot 15048).

Access: Gravel road, 4.3 miles west from Brisco.

Owner: MOUNTAIN MINERALS LIMITED, Box 700, 529 Sixth Street South, Lethbridge, Alta.

Work done: In 1970, 15,747 tons of barite was produced, mostly from underground. During the year the existing underground workings were mined out and completely back-filled with quarry waste. Exploratory diamond drilling was done to test ore possibilities at depth.

PARSON BARITE

MINING DIVISION: Golden.

LOCATION: Lat. 51°01.5′ Long. 116°39′ (82N/2E)
At 3,700 feet elevation, 3½ miles due south of Parson.

CLAIMS: HILLTOP (Lot 14351), SNOWDROP (Lot 14352), HONEST JOHN (Lot 15734).

OWNER: MOUNTAIN MINERALS LIMITED, Box 700, 529 Sixth Street South, Lethbridge, Alta.

WORK DONE: Barite shipped from stockpile, 135 tons.

OMINECA QUEEN

MINING DIVISION: Omineca.

LOCATION: Lat. 55°32′ Long. 124°06′ (93N/9E)
Two miles east of the lower Gaffney Creek bridge on Barite Creek, 17 miles southeast of the village of Manson Creek.

CLAIMS: OMINECA QUEEN 3, 4.

ACCESS: By road from Fort St. James.

OWNER: R. BJERRING.

DESCRIPTION: Barite bands occur within an argillaceous unit of the Cache Creek Group, exhibiting low to medium-grade metamorphism.

WORK DONE: Geochemical survey.

REFERENCE: Assessment Report 2636.

BUILDING-STONE

RAMSHEAD QUARRIES

By J. W. McCammon

LOCATION: Lat. 49°01.9′ Long. 118°22.8′ (82E/1W)
At 1,900 feet elevation, just east of Morrissey Creek, about 900 feet north of Highway 3 at a point 3 miles east of Grand Forks.

ACCESS: By road from Highway 3, across an open field.

OPERATOR: RAMSHEAD QUARRIES LTD., 301, 402 West Pender Street, Vancouver 3.

DESCRIPTION:

Two quarries, one-quarter mile apart, one in dolomite and the other in quartzite, are worked at this site. The rocks belong to the Proterozoic(?) Grand Forks Group which is part of the controversial Shuswap Metamorphic Complex.

The quarries are at the base of a bare steep sidehill that rises abruptly from the north edge of a flat field at the side of the Kettle River valley. Outcrops are absent in the field but almost continuous up the sidehill.

The dolomite quarry is in a band of marble that extends for 1,600 feet northwesterly across the base of the hillside. The band is between 100 and 200 feet thick. Wallrock on both sides is gneiss. The apparent dip of the rocks is about 70 degrees to the southwest. Pegmatite and granitic dykes intrude the banded rocks. Faults cause minor offsets along the marble band. Joints are numerous and so spaced that the largest sound, loose block seen was a cube with a 4-foot-long edge.

The marble is coarsely crystalline, with grains reaching a maximum diameter of one-quarter inch. Colour is off-white to grey, with irregularly grouped parallel streaks at ¼ to 6-inch spacings and scattered patches of yellow-green spots. The rock consists essentially of dolomite with minor calcite, phlogopite, forsterite, apatite, serpentine, tremolite, and other minerals segregated chiefly in the dark streaks and coloured spots.

Three faces have been opened up in the marble. The first is at the west end of the dolomite exposure about 60 to 70 feet above the base of the slope. This face is 150 feet long from east to west and is up to 30 feet high. One 12 to 15-foot-wide dyke that dips 65 degrees east strikes north across the face 100 feet from the east end. One or two coarse-grained horizontal 1-inch-thick veins consisting of diopside, mica, and dark-grey scapolite are exposed near the dyke. A second face is at field level, 500 feet east of the first. This face is 70 feet long with a maximum height of 40 feet. At the west end is a 25-foot-thick layer of granitic rock, then 15 feet more of marble, and then amphibole gneiss. To the east is gneiss. This face is the source of most of the marble production to date. The third face is 700 feet farther east. It is near field level and extends for 100 feet northwesterly with a maximum height of 15 feet. A 20-foot-wide vertical monzonite dyke strikes north across the marble at the west end of the face.

One sample consisting of equal-sized chips picked up at random from fresh muck at the central quarry face was analysed. It had the following percentage composition: $CaO=30.86$, $MgO=20.69$, Insol.$=1.19$, $R_2O_3=0.98$, $Fe_2O_3=0.49$, $MnO=0.039$, $P_2O_5=0.03$, $S=0.004$, Ig. loss$=46.20$, H_2O (105°C)$=0.09$.

The quartzite outcrops at field level 1,000 feet east of the eastern marble face. The exposures reveal three main layers of quartzite interbedded with gneiss with an attitude similar to that of the dolomite. The rock consists of clear glassy quartz grains up to one-quarter inch in diameter with scattered feldspar, sericite, biotite, chlorite, garnet, and altered pyrite grains. The pyrite is almost completely altered to hydrous iron oxides which cause variable amounts of staining of the rock.

Two faces have been worked in the quartzite. The west face is 50 feet long from west to east and about 15 feet high. The other face is 250 feet east of the first. It exposes two layers of quartzite separated by a 30-foot-thick layer of micaceous gneiss.

Rock from the dolomite and quartzite faces is hand-picked in pieces of suitable sizes for rock facing and veneer. It is also crushed and sized for various types of aggregates and granules.

REFERENCES: *Minister of Mines, B.C.,* Ann. Rept., 1960, p. 142; *Geol. Surv., Canada,* Map 6-1967, Kettle River (East Half).

SHEEP CREEK

LOCATION: Lat. 49°08.5′ Long. 117°08.5′ (82F/3E)

Various talus slopes on Waldie and Sheep Creek valley sides, near the junction of these creeks.

WORK DONE: Quartzite facing-stone was hand-sorted at various sites and sold on the local market.

PORCUPINE CREEK

LOCATION: Lat. 49°15.5′ Long. 117°03.7′ (82F/6E)

On Porcupine Creek, about 6 miles east of the Salmo River.

OPERATOR: J. BAKKEN, Salmo.

WORK DONE: A few tons of quartzite building-stone was quarried and sold locally.

INTERNATIONAL MARBLE & STONE PLANT AND QUARRY

LOCATION: Lat. 49°15.5′ Long. 116°38.5′ (82F/7E)
East side of Highway 3, about 1 mile north of Sirdar.

OWNER: INTERNATIONAL MARBLE & STONE COMPANY LTD., 4030 Seventh Street SW., Calgary, Alta.

WORK DONE: Crushing, screening, and bagging of dolomite, quartzite, and granite were carried out in the plant, which was enlarged during the year.

CRAWFORD CREEK DOLOMITE QUARRY

LOCATION: Lat. 49°41.5′ Long. 116°48′ (82F/10W)
On the southeast side of Crawford Creek, about 1½ miles from Crawford Bay.

OWNER: INTERNATIONAL MARBLE & STONE COMPANY LTD., 4030 Seventh Street SW., Calgary, Alta.

WORK DONE: Dolomite production was increased, with nearly all production coming from underground excavation.

CRAWFORD CREEK QUARTZITE QUARRIES

LOCATION: Lat. 49°42.7′ Long. 116°46.5′ (82F/10W)
There are two quarries on the northwest side of the Crawford Creek road, about 2½ miles northeast from Crawford Bay Post Office.

OWNER: INTERNATIONAL MARBLE & STONE COMPANY LTD., 4030 Seventh Street SW., Calgary, Alta.

WORK DONE: Quartzite quarried from the two pits is crushed and screened to produce chips for the building-trade.

L. AND H. SWANSON QUARRY

By J. W. McCammon

LOCATION: Lat. 49°28.7′ Long. 123°45.9′ (92G/5W)
At 200 feet elevation, near the centre of Lot 1331, on the south side of the road, 0.4 mile southwest of the Porpoise Bay wharf at Sechelt.

ACCESS: Road from Porpoise Bay.

OWNER: H. SWANSON, Box 172, Sechelt.

DESCRIPTION: This quarry is on the top of a rounded knoll of medium to coarse-grained, light-grey granodiorite. In a thin-section examined under the microscope, the composition of the rock was seen to be essentially quartz and oligoclase-andesine with lesser orthoclase, biotite, and hornblende. Many vertical and horizontal joints at 1 to 6-foot spacings are present in the outcrop. The largest sound block seen in the quarry was a cube 3 feet long. Similar rock appears to underlie much of the surrounding area, but quarry development may be hindered or prevented by residential construction.

WORK DONE: A semicircular quarry about 120 feet in diameter with a maximum face height of 8 to 10 feet has been opened up just south of the road.

GILLEY QUARRY

LOCATION: Lat. 49°19.2′ Long. 122°40.5′ (92G/7E)
On west bank of Pitt River, immediately south of mouth of Munro Creek.

ACCESS: By road, 7½ miles from Coquitlam.

OWNER: CONSTRUCTION AGGREGATES LTD., 231 West Esplanade, North Vancouver.

WORK DONE: Seventeen men produced quartz diorite.

PITT RIVER QUARRY

Location: Lat. 49° 17.4′ Long. 122° 39.3′ (92G/7E)
East bank of Pitt River, on northern side of Sheridan Hill, 4 miles north of Pitt Meadows.

Access: By road, 5 miles from Pitt Meadows.

Owner: PITT RIVER QUARRIES LTD., 16211—84th Avenue, Surrey.

Work done: A new portable rock-sizing plant and a 75-kva. generating unit were installed. Five men quarried 125,000 tons of quartz diorite.

WATTS POINT

By J. W. McCammon

Location: Lat. 49° 39.2′ Long. 123° 12.4′ (92G/11E)
Lot 7198, Group 1, New Westminster District, on north shore of Watts Point, 2 miles north of Britannia Beach.

Access: By short, steep, rough road northwestward down to the Pacific Great Eastern Railroad tracks and beach, from the view point on Highway 99, 1 mile north of Murrin Provincial Park.

Owner: ROCK POINT INDUSTRIES LIMITED, 1511 West 40th Avenue, Vancouver 13.

Description:

This company has a rock quarry lease covering an area underlain by a circular pile of volcanic flows about half a mile in diameter. Geological Survey of Canada Map 42-1963, Squamish, shows the rocks as probably part of the Garibaldi Group of Quarternary lavas. Quartz monzonite, probably of Tertiary age, surrounds the lava.

The volcanic rocks can be seen in rock cuts and bluffs for 2,800 feet along the tracks and beach and at 860 feet elevation around a transmission tower on a hilltop one-third of a mile south of the tracks. Outcrops are scarce in the area between the tower and the bluffs at the tracks. This area is rough, being deeply dissected by a series of northerly and westerly trending gullies, and it is thickly overgrown by trees and brush.

The volcanic pile is made up of numerous individual flows. These appear to have a general westerly strike and a slight dip to the south. Some tops display gently undulating surfaces. Columnar jointing is well developed in several places.

The most easterly outcrop on the tracks consists of a high vertical bluff composed of several flows showing good columnar jointing. The lower columns are upright, about 15 feet high, and have faces about a foot wide. The rock is fine-grained bluish-grey dacite. Vesicles are abundant. They have been flattened out so that they now form unconnected slits up to 1 centimetre long. In thin-section the rock displays trachytic texture and is seen to consist essentially of plagioclase microlites with magnetite and scattered pyroxene in an indeterminate groundmass.

The next exposure along the tracks is 800 feet to the west. It is black, glassy vesicular dacite. The vesicles are numerous and irregularly shaped. They are slightly flattened. Some are as large as 2 centimetres long with a 1 by ½-centimetre cross-section. Shiny black amphibole crystals are visible in hand specimens. In thin-section the rock is seen to consist of small zoned plagioclase crystals and microlites, pyroxene, amphibole, magnetite, and abundant brown glass.

About 1,000 feet farther west the tracks pass through a deep cut. Columnar jointing is well developed in the exposed rocks through the cut. Convolutions in the flows cause the orientation of the columns to range from vertical to horizontal. The faces of the columns are only 3 to 4 inches wide and cross-joints are well developed at close intervals. At the east end of the cut the rock appears very similar to that at the outcrop last described. At the west end of the cut the rock is fine-grained bluish-grey dacite peppered with irregular vesicles 1 millimetre or less in diameter. Black amphibole needles up to 4 millimetres long are conspicuous in hand specimens. In thin-section the composition is seen to be mainly plagioclase in zoned crystals and microlites, amphibole, pyroxene, and magnetite in an indeterminate groundmass.

In the vicinity of the tower most exposures are of black, glassy vesicular dacite. One thin-section of this rock contained plagioclase, pyroxene, magnetite, and brown glass. The vesicles are numerous, closely spaced, and squashed flat.

No contacts with the surrounding quartz monzonite were seen. This is a coarse-grained, medium-grey rock containing about 32 per cent quartz, 44 per cent oligoclase-andesine, 15 per cent perthite and microcline, and 9 per cent biotite.

WORK DONE: No quarry has been developed and no production has been recorded from this property to date.

VALLEY GRANITE QUARRY

LOCATION: Lat. 49°15.5′ Long. 121°40.5′ (92H/5E)
West side of Highway 1, 10 miles west of Hope.

OWNER: VALLEY GRANITE PRODUCTS LIMITED, 10070 Timberline Place, Chilliwack.

WORK DONE: Granite products, including poultry grits, stucco dash, sand blast materials produced, 5,000 tons.

CATHERINE

LOCATION: Lat. 50°44′ Long. 125°49′ (92K/12W)
On Matsiu Creek, Knight Inlet, at 900 to 2,000 feet elevation.

CLAIMS: CATHERINE, GEORGE, KELLY, BILL, KIR, JOHN, MARBLE, totalling 28.

ACCESS: By aircraft from Campbell River, 55 miles.

OWNER: KNIGHT INLET RESOURCES LIMITED, 670, One Bentall Centre, Vancouver 1.

DESCRIPTION: Marble in a roof pendant in Coast Range granodiorite; some minor copper, silver, lead, zinc showings.

WORK DONE: Topography and surface and underground workings mapped; surface geological mapping, 1 inch equals 100 feet on Catherine 5 to 8; underground geological mapping, 1 inch equals 20 feet on Catherine 7; road construction, 2 miles from beach, at mouth of Matsiu Creek, to lower workings; trenching, 350 feet; surface diamond drilling, three holes totalling 179 feet.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 385.

KOGWA

LOCATION: Lat. 54°01′ Long. 120°14′ (93I/1W)
West end of Kakwal Lake, at approximate elevation of 5,000 feet.

CLAIMS: KOGWA Group, totalling 19.

ACCESS: From Grande Prairie, Alta., by road, 130 miles.

OWNER: KAKWAL DEVELOPMENTS LTD., 414, 718 Granville Street, Vancouver 2.

DESCRIPTION: Horizontal beds of thin-banded quartzite.

WORK DONE: Thirty miles of road constructed.

CEMENT

OCEAN CEMENT LIMITED

Location: Lat. 48°35.1′ Long. 123°31.2′ (92B/12E)
Bamberton.

Owner: OCEAN CEMENT LIMITED (B.C. Cement Division), north foot of Columbia Street, Vancouver 4.

Work done: Cement produced, 383,130 tons.

CANADA CEMENT LAFARGE LTD.

Location: Lat. 49°09.6′ Long. 123°00′ (92G/3E)
On the Fraser River, south shore of Lulu Island, at foot of No. 9 road.

Owner: CANADA CEMENT LAFARGE LTD., head office, 1051 Main Street, Vancouver 4.

Work done: Cement produced, 209,739 tons.

CANADA CEMENT LAFARGE LTD.

Location: Lat. 50°39.7′ Long. 120°03.3′ (92I/9E)
On north bank of South Thompson River, 11 miles east of Kamloops.

Owner: CANADA CEMENT LAFARGE LTD., Box 728, Kamloops.

Work done: Plant went on stream May 1. Cement produced, 25,684 tons.

CLAY AND SHALE

HILLBANK SHALE QUARRY

Location: Lat. 48°43.1′ Long. 123°39.4′ (92B/12E)
On east bank of Koksilah River, 1 mile southeast of Cowichan station.

Access: Road from Hillbank.

Owner: BRITISH COLUMBIA CEMENT COMPANY LIMITED, Cobble Hill.

Description: Quarry in steeply dipping Upper Cretaceous marine shale of the Haslam Formation.

Work done: A new lift was opened up 12 feet below the former quarry floor. In August 1970 the new opening was 60 feet wide and 150 feet long. During the year 28,000 tons of shale was mined and shipped to the Bamberton cement plant.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 388.

BRITISH COLUMBIA LIGHTWEIGHT AGGREGATES LTD.

Location: Lat. 48°48.1′ Long. 123°11′ (92B/14E)
On peninsula between Winter Cove and Lyall Harbour, at north end of Saturna Island.

Owner: BRITISH COLUMBIA LIGHTWEIGHT AGGREGATES LTD., 855 West Broadway, Vancouver 9.

Work done: Plant expansion was completed during 1970 with commencement of operation of an 8-foot-diameter kiln, which had been installed in parallel with the existing 10-foot-diameter kiln. Twenty-two men mined 56,000 tons of shale and produced and shipped 52,000 tons of expanded shale aggregate.

DUNSMUIR SHALE PIT

By J. W. McCammon and J. W. Robinson

Location: Lat. 49°11.8′ Long. 124°05.5′ (92F/1E)

At 900 feet elevation, in the northeast part of Block 226, Dunsmuir Land District, adjoining Weigles (Black Jack, Dumont) road on the north, 2 miles south and west of the power-line crossing at Brannen Lake.

Access: By Weigles road from Highway 19.

Owner: CANADA CEMENT LAFARGE LTD., 1051 Main Street, Vancouver 4.

Description:

At this property, Upper Cretaceous marine shale of the Haslam Formation is quarried for use in cement manufacture.

The fresh shale is dark blue-grey and it weathers brown. The weathered zone, as exposed in the excavations, is 10 to 15 feet thick. The rock has a silty texture. It contains pelecypod and ammonite fossils and scattered, hard, spherical concretions a few inches in diameter. Peculiar irregularly coiled, filled, flattened, tube-like structures about one-quarter inch in diameter and several inches long are also present. The shale is brittle and shatters into ¼ to 2-inch cubical fragments when struck with a hammer. Near-surface spheroidal weathering causes the formation of numerous ellipsoidal pseudo-concretions ranging in diameter from a few inches to 1 foot or more. Most of these shatter on impact into small, cubical fragments. Bedding is poorly displayed. Where visible, it is nearly flat with minor warpings.

Two samples of the shale were collected for analysis. No. 1 consisted of equal-sized chips picked at random from oxidized zone rock that formed the muck pile at the working face of the quarry. Sample No. 2 consisted of equal-sized chips gathered at random from the freshest accessible exposures of the unweathered shale. The percentage compositions of the samples are shown below.

Sample	SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	CaO	MgO	Na_2O	K_2O	H_2O (−105°C)	H_2O (+105°C)
No. 1	52.88	17.01	8.14	2.51	1.50	0.54	2.04	2.81	1.99	3.88	6.11
No. 2	53.64	16.06	3.02	7.33	1.56	1.14	2.59	2.65	2.20	2.48	6.69

Work done: The quarry being worked in August 1970 was about 800 feet long and 800 feet wide, with maximum face heights of 10 to 15 feet. North of the pit an area about twice that size was cleared of trees and stripped of overburden ready for quarry expansion in that direction. The shale is not blasted but is dug out of the bench, using a 955-K Caterpillar track loader. It is loaded into six 850 Mercury trucks, hauled to a stockpile at the dock and is then loaded onto a barge for shipment to the Lafarge cement plant on Lulu Island. During 1970, 45,300 tons of shale was mined and shipped.

Reference: *Geol. Surv., Canada,* Map 49-1963, Alberni.

RICHMIX QUARRY

Location: Lat. 49°03.5′ Long. 122°11.7′ (92G/1E)

Adjoining Kilgard to the northeast.

Owner: RICHMIX CLAY PRODUCTS LIMITED, 2890 East Kent Avenue, Vancouver 12.

Work done: Fireclay quarried and trucked to the plant in Vancouver, where firebrick was manufactured, 4,024 tons.

CANADIAN REFRACTORIES LIMITED

Location: Lat. 49°03.2′ Long. 122°17.3′ (92G/1W)
49°03.5′ 122°11.7′ (92G/1E)

Plant at Abbotsford; mine and quarries at Kilgard.

Owner: CANADIAN REFRACTORIES LIMITED (Western Division), Box 160, Abbotsford.

Work done: Clay produced by seven men from underground fireclay mine at Kilgard, 21,726 tons; clay produced by seven men from Kilgard No. 9, Straiton, and Selby open pits, 66,580 tons.

HANEY BRICK AND TILE LIMITED

Location: Lat. 49°12.6′ Long. 122°35.9′ (92G/2E)

On north bank of Fraser River, at east edge of Haney.

Owner: HANEY BRICK AND TILE LIMITED, Box 38, Maple Ridge.

Work done: Clay quarried adjacent to plant and manufactured into 7,925 tons of facebrick, common brick, drain and structural tile, flue-lining, and flower-pots.

DIATOMITE

CROWNITE INDUSTRIAL MINERALS LTD. DIATOMITE QUARRY

By W. G. Clarke

Location: Lat. 52°57.6′ Long. 122°32.2′ (93B/15E)

Quarry on Lot 906, 1½ miles southwest of West Quesnel. Plant at south end of old bridge over Quesnel River at its junction with the Fraser River.

Access: By gravel road from West Quesnel, 1½ miles.

Owner: CROWNITE INDUSTRIAL MINERALS LTD., 706 Seventh Avenue SW., Calgary, Alta.

Work done: At the quarry approximately 40 acres was cleared and the topsoil stockpiled. Some overburden was removed. Five 10-foot-high benches, 1,000 feet long, were established. About 10,000 tons of diatomite was stockpiled and 500 tons shipped. Some 1,500 tons of burned shale mined on Lot 222, adjacent to the plant, was processed and sold as pozzolan. A new plant, capacity 40,000 tons per year, was put into operation. It consists mainly of three vibratory feeders, a vibrating screen driven by a 3-horsepower motor, four conveyors driven by a 1-horsepower, a ¾-horsepower, and two ½-horsepower motors respectively, a dryer and boiling-machine each driven by two ¾-horsepower motors, and two bagging-machines.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 389.

GYPSUM

WESTERN GYPSUM LIMITED

Mining division: Golden.

Location: Lat. 50°30′ Long. 115°53.8′ (82J/5W)

Between 4,000 and 5,000 feet elevation on the north side of Windermere Creek, 8 miles east of Windermere.

Access: By private paved road, 11 miles from Wilmer.

Owner: WESTERN GYPSUM LIMITED, 2650 Lakeshore Highway, Clarkson, Ont.; quarry address, Box 217, Invermere.

WORK DONE:

At the quarry, 319,480 tons of gypsum was mined and put through the primary crusher. The gypsum was then hauled in large-capacity trucks to the secondary crusher, screening, and loading plant at Wilmer. From Wilmer, 266,689 tons of prepared gysum was shipped by rail to company plants at Calgary and Vancouver. A further 30,000 tons of gypsum fines was shipped from the stockpile at Wilmer to company plants at Calgary and Vancouver.

Stripping of overburden in the quarry is carried on throughout the year, and is well ahead of the mining operation. Toward the end of the year some exploration drilling was done to check the depth and extent of the deposit where the stripping of overburden was well in advance of the quarry benches.

The company employed 29 workmen and reported no accidents during 1970.

JADE (NEPHRITE)

In 1970, jade (nephrite) was produced from the Fraser and Bridge Rivers and Marshall and Hell Creeks in the Lillooet area; from O'Ne-el Creek and Mount Ogden in the Omineca area; and from Seywerd and Wheaton Creeks in the Dease Lake area.

The jade from Marshall, Hell, and Seywerd Creeks and from Mount Ogden was mined from bedrock occurrences; the rest was from alluvial boulders in streams not far distant from their presumed bedrock sources.

Jade for the first time was identified from material in place at the open-pit asbestos mine on Mount McDame owned by Cassiar Asbestos Corporation Limited.

Production is recorded from the following companies and individuals:

B. Seywerd, Seywerd Creek, Dease Lake.
Davis Jade of Canada Ltd., Wheaton Creek.
Northern Jadex Co. Ltd., Mount Ogden.
M. Stewart, Ogden Creek.
Far North Jade Ltd., Ogden Creek.
E. Osterlund, Bridge River.
R. Purvis, Fraser River.
International Jade Ltd., Marshall Creek.

PEP

MINING DIVISION: Kamloops.

LOCATION: Lat. 50°10′ Long. 121°55′ (92I/4W)

Some confusion regarding location: may be on west side of Antimony Mountain or west side of Skihist Mountain, approximately 15 miles west-southwest of Lytton.

CLAIMS: PEP 1 and 2.

ACCESS: Pack-trail from Kanaka or helicopter.

OPERATOR: MAGNETRON MINING LTD., 2020, 777 Hornby Street, Vancouver 1.

METALS: Vesuvianite, mutton fat jade.

DESCRIPTION: The vesuvianite and mutton fat jade occur in serpentine intrusive into Triassic sedimentary rocks that are enveloped by granodiorite.

WORK DONE: Reconnaissance geological examination.

REFERENCE: Assessment Report 2528.

GREEN BAY

MINING DIVISION: Lillooet.

LOCATION: Lat. 50°55′ Long. 122°35′ (92J/15E)

On the north side of Marshall Creek.

CLAIMS: GREEN BAY, JIM, BLUE.

ACCESS: By road from Lillooet.

OWNER: GREEN BAY EXPLORATION AND MINING CO. LTD., Box 36, Chilliwack.

DESCRIPTION: Jade occurs *in situ* in shear zones within serpentinized peridotite.

WORK DONE: Two hundred and fifty lineal feet of trenching and an area 100 by 200 feet stripped to a depth of 30 feet.

BIRKENHEAD

MINING DIVISION: Lillooet.

LOCATION: Lat. 50°50′ Long. 122°17′ (92J/16W)
Northwest from the head of Hell Creek, at 7,500 feet elevation.

CLAIMS: BIRKENHEAD 1 to 16.

ACCESS: Seventeen miles by truck from the Yalakom River road.

OWNER: BIRKENHEAD JADE MINES LTD., 426 Homer Street, Vancouver 3.

WORK DONE: Five hundred lineal feet of trenching and 6,000 square feet of stripping on the Birkenhead 4, 5, and 6 claims.

NORTHERN JADEX

MINING DIVISION: Omineca.

LOCATION: Lat. 55°52′ Long. 125°48′ (93N/13W)
On the southwest side of Mount Ogden.

CLAIMS: ED and JADE recorded mineral claims, also placer leases along the nearby creek.

ACCESS: By helicopter from the Takla Mercury camp.

OWNER: NORTHERN JADEX CO. LTD., Manson Creek.

WORK DONE: A crew of six to eight men from July until October mined jade from a bedrock occurrence in serpentinite. Some 50 tons was taken by caterpillar train and aircraft to Manson Creek for further cutting and sorting.

LIMESTONE

COBBLE HILL QUARRY

LOCATION: Lat. 48°40.6′ Long. 123°37.4′ (92B/12E)
On Lot 9, Range 3, at southwest corner of Cobble Hill, 2 miles southwest of Cobble Hill station.

OWNER: BRITISH COLUMBIA CEMENT COMPANY LIMITED, Cobble Hill.

WORK DONE: Limestone produced for use in Bamberton cement plant, 519,500 tons. During 1970 a new 138-kva. power source was provided.

IMPERIAL LIMESTONE QUARRY

LOCATION: Lat. 49°31.7′ Long. 124°44.4′ (92F/10E)
Summit of hill on Lot 500, three-quarters of a mile southwest of Spratt Bay on the north coast of Texada Island, 2 miles southeast of Vananda.

OWNER: IMPERIAL LIMESTONE COMPANY LIMITED, 5427 Ohio Avenue South, Seattle, Wash. 98134.

WORK DONE: Quarry operated on Lot 500, stucco and whiting produced in plant at Vananda dock, whiting and coarse limestone produced at Spratt Bay. Limestone produced, 174,220 tons.

IDEAL CEMENT QUARRY

LOCATION: Lat. 49°42.9′ Long. 124°33.8′ (92F/10E)
On Lot 25, Texada Island, about 2½ miles south of Vananda.

OWNER: IDEAL CEMENT COMPANY (Rock Products Division), 610, 1200 West Pender Street, Vancouver 1.

WORK DONE: Limestone quarried, 800,000 tons; limestone shipped, 876,000 tons. A Hummer screen and conveyor were added to the plant.

BEALE QUARRY

LOCATION: Lat. 49°45′ Long. 124°31.9′ (92F/15E)
On north coast of Texada Island, 1 mile southeast of Vananda.

OWNER: CANADA CEMENT LAFARGE LTD. (Pacific Region), 1051 Main Street, Vancouver 4.

WORK DONE: Limestone quarried, 956,990 tons; limestone shipped, 755,000 tons.

DOMTAR QUARRY

LOCATION: Lat. 49°47.2′ Long. 124°37.1′ (92F/15E)
North end of Texada Island.

CLAIMS: Lots 13, 17, 22, 23, 34 to 39, 271, 305, 350.

ACCESS: By road, 1 mile from Blubber Bay.

OPERATOR: DOMTAR CHEMICALS LIMITED (Lime Division), 470 Granville Street, Vancouver 1.

DESCRIPTION: High calcium limestone in the Marble Bay Formation of Triassic age.

WORK DONE: Aerial survey of quarry, scale 1 inch equals 65 feet; stripping, 4 acres; surface diamond drilling, 14 holes totalling 2,263 feet on Lot 13. Limestone produced, 860,000 tons; limestone shipped, 640,100 tons.

FRASER VALLEY LIME SUPPLIES

LOCATION: Lat. 49°12′ Long. 121°43.2′ (92H/4E)
East side of Highway 1, three-quarters of a mile east of Popkum.

OWNER: FRASER VALLEY LIME SUPPLIES, 976 Adair Avenue, Coquitlam.

WORK DONE: The diesel motor which supplied the power for the mill broke down on March 4, so production ceased. Limestone produced, crushed, and sized for feed and industrial filler, 667 tons.

By E. Sadar

HARPER RANCH QUARRY

LOCATION: Lat. 50°40.3′ Long. 120°03.9′ (92I/9E)
North side of South Thompson River, approximately 11 miles east of Kamloops.

ACCESS: A new bridge connects the plant with the Trans-Canada Highway at Campbell Creek junction, about 11 miles east of Kamloops.

OWNER: CANADA CEMENT LAFARGE LTD., Box 728, Kamloops.

WORK DONE: Quarrying of limestone rock began in spring 1970. Mining was under contract to Plateau Construction Limited. Limestone hauled to plant, 80,635 tons.

REFERENCES: *Minister of Mines, B.C.*, Ann. Repts., 1966, p. 227; 1968, p. 321; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 397.

JESMOND LIMESTONE CORPORATION QUARRY

By J. W. McCammon

LOCATION: Lat. 51°07.2′ Long. 121°51.4′ (92P/4W)
At 5,750 feet elevation, 1.2 miles due east of the centre of Lot 4415, 9 miles northwest of Kelly Lake.

ACCESS: By road, 2 miles east from the Kelly Lake–Jesmond road at a point 9.2 miles northwest of the Kelly Lake junction.

OPERATOR: RAMSHEAD QUARRIES LTD., 301, 402 West Pender Street, Vancouver 3.

DESCRIPTION:

The quarry site is in Upper Permian limestone of the Marble Canyon Formation of the Cache Creek Group. This is part of a limestone belt that ranges from 1 to 10 miles wide and extends almost continuously for 130 miles northwestward from Spences Bridge. Chert, argillite, and some volcanic rocks are interbedded with the limestone. The limestone itself varies in purity from place to place.

The quarry face is at the base of bare rock bluffs near timberline. Rock exposures are fairly continuous upward to the ridgetop. Below the face the bush is thick and outcrops are scarce.

The limestone is mostly massive, fine-grained rock that varies from light grey through mottled white and grey to dark grey. There seems to be a general gradual change from lightest coloration at the east end of the quarry face to darkest at the west end. The weathered colour is light grey. Except for scattered crinoid plates, no macro-fossils were seen, although thin-sections reveal many fossil shapes. In a few places on the slope above the quarry-site small areas of the limestone are crisscrossed by hairline quartz veinlets, some irregular areas of breccia are present, and inclusions of dark chert occur. In thin-sections the rock is seen to be highly cataclastic, almost mylonitic. It consists essentially of calcite with occasional grains and scattered thin veinlets of quartz.

In road cuts west of the end of the quarry-site, thin-bedded argillite, two or three thin limestone beds, and schisted small-pebble conglomerate form the bedrock. The contact between the limestone and the other rocks is not well exposed but appears to be faulted. No bedding was recognized in the main limestone band. The argillite strikes 25 degrees west of north and is nearly vertical.

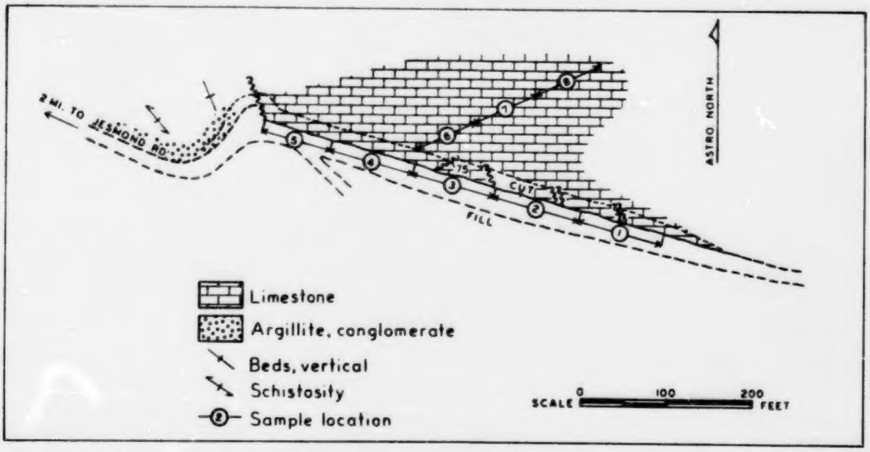

Figure 71. Jesmond Limestone Corporation quarry limestone samples.

Several faults are exposed in the quarry face. Most are nearly vertical and strike between 20 and 30 degrees west of north. Joints are numerous, of variable orientations, and range from 2 or 3 inches to 1 foot apart. A crude schistosity is present in the limestone toward the west edge. This is better developed in the rocks to the west, where it strikes about north 40 degrees west and is vertical.

Eight samples were collected for analysis, as shown on the accompanying sketch (Fig. 71). Each consisted of equal-sized chips of fresh rock gathered at 5-foot spacings along the sample intervals indicated. Samples 6, 7, and 8 were collected along slope distances of 100 feet each. The percentage compositions of the samples are shown in the following table:

Sample	CaO	MgO	Ig. Loss	Insol.	R_2O_3	Fe_2O_3	MnO	P_2O_5	S	H_2O (105°C)
1	55.26	0.32	43.61	0.50	0.26	0.13	0.005	0.06	0.002	0.06
2	55.46	0.35	43.68	0.20	0.35	0.06	0.003	0.06	0.002	0.17
3	55.11	0.37	43.86	0.12	0.38	0.04	0.002	0.08	0.002	0.12
4	54.91	0.65	43.45	0.84	0.39	0.13	0.003	0.07	0.002	0.17
5	53.21	0.58	42.48	2.73	0.64	0.21	0.006	0.07	0.005	0.14
6	55.37	0.42	43.38	0.40	0.40	0.10	0.002	0.07	0.002	0.01
7	55.34	0.39	43.75	0.25	0.22	0.09	0.003	0.01	0.002	0.01
8	55.26	0.37	43.69	0.61	0.13	0.07	0.002	0.02	0.001	0.02

Work done: Access road built from Jesmond road to quarry-site and 500-foot-long quarry face prepared along base of bare rock bluff.

References: *Minister of Mines, B.C.*, Ann. Rept., 1958, pp. 90–93; *B.C. Dept. of Mines*, Bull. No. 44, Geology of the Fraser River Valley, 1961; *Geol. Surv., Canada*, Map 3-1966, Bonaparte River.

DAHL LAKE QUARRY

Location: Lat. 53°47.5′ Long. 123°17′ (93G/14W)

On hill at northeast corner of Dahl Lake, 22 miles southwest of Prince George.

Access: A 6-mile-long gravel road from the quarry joins Highway 16 on the south side, 22 miles west of Prince George.

Operator: KOKANEE CONTRACTING LIMITED, 3905—18th Avenue, Prince George.

Work done: Crushed, washed, and screened limestone produced, 30,000 tons; stone shipped to Prince George and Intercontinental Pulp Mills; some fines used for driveway topping.

Reference: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 393.

PTARMIGAN CREEK QUARRY

Location: Lat. 53°41.5′ Long. 120°53.8′ (93H/10W)

Beside the Canadian National Railway tracks at Ptarmigan Creek, 2 miles west of Urling.

Operator: QUESNEL REDI MIX, Quesnel.

Work done: A crew of six men worked for seven months producing limestone for the Northwood Pulp Mill in Prince George and ballast and riprap for the railway.

Reference: Mines Branch Publication No. 811, Limestones of Canada, Pt. V, 1944, *Dept. of Mines and Resources*, Ottawa, pp. 200, 221.

NECOSLIE RIVER LIMESTONE

LOCATION: Lat. 54°22′ Long. 124°06′ (93K/8E)
North side Necoslie River road, 8 miles southeast of Fort St. James.

CLAIMS: JOHN 1 to 6.

ACCESS: By road, 8 miles from Fort St. James.

OPERATOR: DOMTAR CHEMICALS LIMITED, Box 7212, Montreal, P.Q.

DESCRIPTION: High calcium limestone.

WORK DONE: Survey for limestone lease; five percussion drill holes totalling 406 feet on John 1 and 2 claims.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 392.

TERRACE CALCIUM PRODUCTS LTD. QUARRY

LOCATION: Lat. 54°30′ Long. 128°28′ (103I/9W)
On Copper Mountain, north of Thornhill Mountain, 4½ miles east of Terrace, at 2,900 to 3,100 feet elevation.

ACCESS: By road, 10 miles from Terrace via the British Columbia Telephone Company road to Thornhill Mountain microwave station.

OPERATOR: TERRACE CALCIUM PRODUCTS LTD., Box 207, Terrace.

WORK DONE: The quarry was not worked during 1970, but 94 tons of limestone products was shipped from stockpile. An Imperial Sawyer-Massey jaw-type rock crusher (8 by 40 inches) and a Geoffrey No. 2 Lime Pulverizer were set up. The plant is now a one-man operation and on a trial run it produced 3½ tons of pulverized limestone (fertilizer grade) per hour.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1969, p. 392.

MAGNESITE

ROK

LOCATION: Lat. 50°47′ Long. 115°40′ (82J/13E)
At 4,300 feet elevation on west flank of Mount Brussilof, 20 miles northeast of Radium Junction.

CLAIMS: ROK 15, 17, 19 to 22.

ACCESS: By rough road from Kootenay River road, 20 miles.

OPERATOR: BRUSSILOF RESOURCES LTD., 109, 718 Eighth Avenue SW., Calgary, Alta.

DESCRIPTION: Magnesite occurs as a bedded deposit in Lower Cambrian carbonate rocks.

WORK DONE: Exploration to evaluate the deposit.

REFERENCE: *Geol. Surv., Canada,* Paper 66-1, 1966, pp. 65, 66.

MARL

CHEAM MARL PRODUCTS

LOCATION: Lat. 49°11.5′ Long. 121°45′ (92H/4W)
Cheam Lake near Popkum.

ACCESS: Road, 1 mile north off Highway 1 at Popkum.

OWNER: CHEAM MARL PRODUCTS LIMITED, 13 Fletcher Street South, Box 113, Chilliwack.

DESCRIPTION: The material mined consists of a post-glacial deposit of marl that forms the bed of former Cheam Lake, drained several years ago. Marl and topsoil are excavated by two small draglines. The marl is spread on an asphalt drainage pad, and air dried for a year. It is then loaded into trucks by a third dragline and delivered to consumers.

WORK DONE: Marl produced, 25,650 tons; marl shipped, 25,286 tons.

PHOSPHATE

WW

MINING DIVISION: Fort Steele.

LOCATION: Lat. 49°27.5′ Long. 114°42′ (82G/7E)
At 6,000 to 6,800 feet elevation, near Barnes Lake, 5 miles southwest of Corbin.

CLAIMS: WW 1 to 110.

ACCESS: By road from Corbin, 5 miles.

OPERATOR: WESTERN WARNER OILS LTD., 215A Tenth Street NW., Calgary 41, Alta.

DESCRIPTION: Outcropping rocks range from Mississippian to Jurassic in age and comprise a thick sequence of marine and terrestrial sediments. Phosphate rock is sedimentary and lies at the base of the Fernie shale.

WORK DONE: Trenching, 8 by 3,600 feet on WW 1 to 40; surface diamond drilling, three holes totalling 217 feet on WW 48, 57, and 101.

REFERENCE: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 398.

SAND AND GRAVEL

Data on sand and gravel production are presented on the following pages. The abbreviations used in the table for the types of sand and gravel produced are as follows: AA= asphalt aggregate; SA=sized aggregate; WS=washed and sized aggregate; S=sand; RP=run-of-pit material; CA=crushed aggregate; AP=asphalt paving mix; RM=ready-mix concrete.

Sand and Gravel Pits

Location	Operator	Equipment	Men	Production
Prince Rupert Highway District—				
(1) Mile 3, Stewart–Watson Lake Road	Department of Highways	Front-end loader	2	RP=19,097 yd.
(2) Mile 16, Stewart–Watson Lake Road	Department of Highways	Front-end loader	2	RP=10,922 yd.
(3) Mile 2, Kitsault Road, Alice Arm	Department of Highways	Front-end loader	1	RP=920 yd.
(4) Construction pit, Graham Island, Queen Charlotte Islands	Department of Highways	Two front-end loaders	8	RP=54,855 yd.
(5) Ross pit, Graham Island, Queen Charlotte Islands	Department of Highways	Front-end loader	2	RP=1,025 yd.
Terrace Highway District—				
(1) Mile 1, Lakelse Lake Road 53, pit 1	Department of Highways	One front-end loader, screening plant, two 3-ton trucks	5	S=3,000 yd.
(2) Mile 2.6, Highway 16 West, pit 3	Department of Highways	One crusher, two caterpillars, two 3-ton trucks	7	CA=30,000 yd.
(3) Mile 3, Old Airport Road 2, pit 5	Department of Highways	One front-end loader, two 3-ton trucks	4	RP=1,000 yd.
(4) Mile 4, Kalum Lake Road 3, pit 6	Department of Highways	One crusher, two caterpillars, four 3-ton trucks, one front-end loader	10	CA=20,000 yd., RP=1,500 yd.
(5) Mile 11.5, Kitimat Highway 25, pit 7	Department of Highways	One front-end loader, four 3-ton trucks	6	RP=2,000 yd.
(6) Mile 2.3, Beam Station Road 90, pit 10	Twin River Timber	One front-end loader, five tandem trucks	8	RP=25,000 yd.
(7) Mile 8, Highway 16 East, pit 13	Coppersides Estate	One front-end loader, five tandem trucks	8	RP=22,000 yd.
(8) Mile 23.7, Highway 16 East, Sanderson Point, pit 15	Department of Highways	One front-end loader, two 3-ton trucks	4	RP=1,300 yd.
(9) Canadian National Railway, Mile 42 West, pit 19	Department of Highways	One front-end loader, five tandem trucks, two caterpillars	10	CA=2,500 yd.
(10) Mile 3.2, Kalum Lake Road, pit 24	Department of Highways, Coppersides Estate	Six tandem trucks, one caterpillar	13	RP=25,000 yd.
(11) 2.5 miles north of Hirsch Creek, Highway 25, pit 33	Department of Highways	One screening plant, four 3-ton trucks, one caterpillar, one front-end loader	7	S=1,000 yd.
(12) Mile 58, Highway 16 West	Department of Highways	One crusher, one front-end loader, one caterpillar, two 3-ton trucks	7	S=8,000 yd.
(13) Mile 57, Highway 16 West	Department of Highways	One front-end loader, one caterpillar, five tandem trucks	8	CA=8,200 yd.
(14) Kwinitsa Bar, Highway 16 West	Department of Highways	One front-end loader, four tandem trucks, two 3-ton trucks	6	RP=15,000 yd.
(15) Mile 67, Highway 16 West	Department of Highways	One front-end loader, one caterpillar, five tandem trucks	—	CA=14,800 yd.
Sandhill—Kitimat	Ocean Cement Limited	One 5-yard Sauerman scraper, one 3-yard F.E.L.	3	RP, WS, and RM.
Sandhill—Kitimat Little, Haugland, and Kerr pit (Terrace)	L. G. Scott and Sons Construction Ltd.	One El Jay crusher, one 950 loader, one D-9 caterpillar	4	RP and CA.
Hastings Arm	Armour Salvage (1949) Ltd.	Tug, derrick, scow	3	WS.
Secret Cove	Armour Salvage (1949) Ltd.	Tug, derrick, scow	3	WS.
Metlakatla Bar	Armour Salvage (1949) Ltd.	Tug, derrick, scow	3	RP.
McNichol Creek	Armour Salvage (1949) Ltd.	Tug, derrick, scow	3	S.
Skeena River	Armour Salvage (1949) Ltd.	Tug, derrick, scow	3	S.

Sand and Gravel Pits—Continued

Location	Operator	Equipment	Men	Production
Coquitlam Municipality—				
(1) West end of Westwood Road	Corporation of the District of Coquitlam	Front-end loader, portable crushing, screening	1	RP=65,840 yd.
(2) Pipeline Road, 3½ miles north of Lougheed Highway	Jack Cewe Ltd., Box 1100, Coquitlam	Shovel, screening, crushing, paving plant	10	RP, SA, and AP.
(3) Pipeline Road, 3 miles north of Lougheed Highway	S & S Sand and Gravel Limited, RR 1, Port Coquitlam	Front-end loader, crushing, screening, washing	8	RP, WS, and SA.
(4) Pipeline Road	Columbia Bitulithic Limited, Box 4225, Station D, Vancouver 9	Front-end loader, crushing, screening	—	RP, SA, and AP=22,930 yd.
(5) Pipeline Road, 1½ miles north of Lougheed Highway	Allard Contractors Ltd., 862 Lougheed Highway, Port Coquitlam	Front-end loader, crushing, screening	3	RP and SA.
(6) Pipeline Road, 1 mile north of Lougheed Highway	Canada Cement Lafarge Ltd., 1051 Main Street, Vancouver	Front-end loaders, 600-ton per-day washing and screening, readymix	18	SA, WS, and RM.
(7) Pipeline Road, 4 miles north of Lougheed Highway	Allard Contractors Ltd., 862 Lougheed Highway, Port Coquitlam	Front-end loader	1*	RP.
(8) Fraser River at Mary Hill, 2 miles south of Port Coquitlam	Construction Aggregates Limited, 231 West Esplanade, North Vancouver	Shovels, etc., 500-tons-per-hour processing plant, barge-loading facilities	50	WS.
Annacis Island—Fraser River at Annacis Island	Willson Construction Co. Ltd., 4984—48th Ave., Ladner	Front-end loader	2	S.
Maple Ridge Municipality—				
(1) 33rd Road, 1 mile south of Silver Valley	S. Berto, RR 2, Maple Ridge	Shovel	1*	RP=5,549 yd.
(2) Grant Hill, 1 mile east of Albion and also adjoining Kirkpatrick pit	Corporation of the District of Maple Ridge	Front-end loader, crushing	—	RP and SA.
(3) Grant Hill, ¾ mile north of municipal pit	Williamson Blacktop and Landscaping Ltd., Haney	Front-end loader, crushing, screening	—	RP and SA.
(4) Grant Hill, ½ mile north of municipal pit	Allard Contractors Ltd., 862 Lougheed Highway, Port Coquitlam	Front-end loader, crushing, washing, screening	2	WS.
(5) Grant Hill, ½ mile north of municipal pit	McIntosh Sand and Gravel Limited, 10412 Industrial Ave., Whonock	Front-end loaders, crushing, screening, washing	3	RP, WS, and SA=41,000 yd.
(6) Lougheed Highway south of Grant Hill	Walske Ready Mix Ltd., 23616 River Road, Haney	Shovel, front-end loader, crushing, washing, screening, readymix	18	WS and RM=106,000 yd.
(7) Albion	Columbia Bitulithic Limited, Box 4225, Station D, Vancouver 9	Front-end loader, crushing, screening	—	RP and SA=73,050 yd.
(8) Alouette River, east end of 27th St.	Kirkpatrick Sand and Gravel Ltd., 22357 McIntosh St., Haney	Front-end loader	2*	RP.
(9) One mile north of Websters Corners, ½ mile east	Kirkpatrick Sand and Gravel Ltd., 22357 McIntosh St., Haney	Shovel, washing, screening	2*	RP and WS.
(10) Maple Ridge, east of 284th St.	Douglas Lasser, RR 2, Haney	Front-end loader	1*	RP.
(11) Maple Ridge, east of 284th St.	C. Cozens, Maple Ridge		—	RP.
(12) Maple Ridge, east of 108th Ave.	M. Blazicevic, 3415—12th Road, Maple Ridge	Front-end loader	—	S.
(13) Lougheed Highway, 1 mile east of Whonock	W. A. George, Whonock	Front-end loader	1*	RP=1,598 yd.

Mission Municipality—				
(1) 2.3 miles south of Steelhead, Dewdney Trunk Road	Cannon Contracting Ltd., Box 178, Mission	Front-end loader, crushing, screening	2*	RP and SA.
(2) 2.2 miles south of Steelhead, Dewdney Trunk Road	M. Catherwood, RR 1, Mission		1*	RP.
(3) 1 mile east of Stave Falls powerhouse	Corporation of the District of Mission		—	S.
(4) 3 miles east of Stave Falls powerhouse	Corporation of the District of Mission		—	RP.
(5) 2 miles east of Ruskin powerhouse	Corporation of the District of Mission	Front-end loader	2	RP and SA.
(6) Mission	Department of Highways, Chilliwack	Front-end loader, screening	—	RP and SA=27,800 yd.
Kent Municipality—				
(1) West end of Cemetery Road, south of Mount Agassiz	Corporation of the District of Kent	Shovel	2	RP.
(2) McCallum Road, 1½ miles west of Harrison Hot Springs Road	Danielson Contracting Ltd., McCallum Road, Agassiz	Front-end loader	2*	RP.
(3) McCallum Road	Department of Highways, Chilliwack	Front-end loader, screening	4	RP and SA=11,800 yd.
(4) Fraser River bar, directly south of Agassiz	Morrow's Trucking & Reddi-Mix Ltd., 7985 Morrow Road, Agassiz	Front-end loader, trucks	3	RP, SA, and RM.
(5) 1 mile north of Agassiz	Department of Highways	Front-end loader, trucks	2	RP.
(6) ½ mile south of Rosedale–Agassiz Bridge	Department of Highways	Front-end loader, trucks	2	RP.
(7) ½ mile west of Hunter Creek	Department of Highways	Front-end loader, trucks	2	RP.
Indian Reserve 1—Cheam View	George Beamin	Front-end loader, screening, washing	—	RP, SA, and WS.
Chilliwhack Municipality—				
(1) Arnold Road, bank of Fraser River	P. Heppner & Son Trucking, 7113 Sumas Prairie Road, Sardis	Front-end loader	2*	RP.
(2) Fraser River bars, etc.	Chilliwack Gravel Sales Ltd.	Bucket-line dredge, front-end loader	2	RP and WS.
Hope—8 miles north of Hope Fraser River bars	Channel-Bar Mining Co. Ltd.	Front-end loader, trucks	—	RP and WS.
Sumas Municipality—at foot and east of Taggart Peak	Various operators, but owned by H. Quadling, RR 1, Yarrow	Front-end loader, screening	3*	RP and SA.
Matsqui Municipality—				
(1) 1 mile east of Abbotsford	Blackham's Construction Ltd., Box 39, Abbotsford	Front-end loaders, screening, washing, crushing	7	RP, SA, and WS=200,718 yd.
(2) Trethewey Road, ¾ mile north of Clearbrook	Department of Highways, Chilliwack	Front-end loader, screening	4	RP and SA=10,250 yd.
(3) Clearbrook Road, ½ mile north of border	Abbotsford Gravel Sales Ltd., Box 8, Abbotsford	Scraper, front-end loader, screening, washing, readymix plant of Totem Trucking Ltd.	3	WS, RP, and RM=45,622 yd.
(4) 12th Ave., ¼ mile west of Clearbrook Road	Valley Rite-mix Ltd., Box 430, Clearbrook	Scraper, front-end loader, screening, washing, crushing, readymix plant	4	RP, SA, WS, and RM=169,016 yd.
(5) Corner LeFeuvre Road and Eighth Ave., Caplette pit	Ernie's Trucking Ltd., Box 365, Aldergrove	Front-end loader	1	RP.
(6) LeFeuvre Road	Corporation of the District of Matsqui	Front-end loader, crushing, screening	—	RP and SA=132,963 yd.
Langley Municipality—				
(1) Kinch Road at 36th Ave. and Jackman Road	Corporation of the Township of Langley	Front-end loader, crushing, screening	4	RP and SA=59,933 yd.
(2) North of the northeast corner of Jackman Road and Eighth Ave.	Aldergrove Cement Tile Products, S. Omelaniec, manager	Front-end loader, screening	1*	RP, WS, and topsoil=3,800 yd.
(3) ¼ mile north of corner of Jackman Road and Eighth Ave.	J. Craig, Trans-Canada Highway, Langley	Front-end loader	1*	RP.

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* Part time.

Sand and Gravel Pits—Continued

Location	Operator	Equipment	Men	Production
Langley Municipality—*Continued*				
(4) Dogwood Ave., off Brown Road	Kitsul Bros. Gravel Sales Ltd., 24306 Fraser Highway, RR 3, Langley	Front-end loader	2*	RP and S=62,696 yd.
(5) Glen Valley Road at 252nd St.	Fort Langley Aggregates; W. Sager, 25394 River Road (RR 6), Langley	Dragline, front-end loader, crushing, screening, washing	5	RP, WS, and SA.
(6) 8802 Hudson Bay Road, Fort Langley	Clark Gravel & Ready Mix Ltd., Box 855, Langley	Front-end loader, crushing, screening, washing	3	RP, WS, and RM=30,000 yd.
(7) 2962 Lambert Road, Highland pit	Construction Aggregates Ltd., 231 West Esplanade, North Vancouver	Dragline, front-end loader, crushing, screening, washing	8	RP, WS, and SA.
(8) 32nd Ave. at Kinch Road	Oscar Rees Gravel Sales Ltd., Box 847, Langley	Dragline, front-end loader, screening	5	RP and SA=132,881 yd.
(9) Boundary Road at Surrey boundary	Border Sand & Gravel Ltd., Boundary Avenue (RR 2), White Rock	Front-end loader, crushing, screening, washing	3	RP and WS=154,856 yd.
Surrey Municipality—				
(1) Campbell River Road at Langley boundary	White Rock Sand and Gravel; C. E. Schuler, 2546—176th St. (RR 2), Cloverdale	Shovel, front-end loader, screening, washing	3	RP, SA, and WS.
(2) 24th Ave. at Langley boundary	Corporation of the District of Surrey	Front-end loader	....	RP and SA.
(3) 160th St., south of 24th Ave.	Corporation of the District of Surrey	Front-end loader	....	RP.
(4) 53rd Ave. at Delta boundary	Corporation of the District of Surrey	Front-end loader	....	RP.
(5) 28th Ave. at 194th St.	Corporation of the District of Surrey	Front-end loader	....	RP.
(6) 96th Ave. at Langley boundary	Corporation of the District of Surrey	Front-end loader	....	RP and SA.
Delta Municipality—				
(1) ½ mile west of Scott Road at 68th St.	Standard General Construction (International) Limited, 6631—120th St., North Surrey	Front-end loaders, crushing, screening, washing	9	RP, WS, and SA=517,264 yd.
(2) 10720—84th Ave.	M & W Sand and Gravel Ltd., 948 Beckwith Road, Richmond	Front-end loader	1*	RP.
(3) Fraser River at Annieville	Sabre Bulldozing Ltd., 719 No. 3 Road, Richmond	Front-end loader	2	S.
Howe Sound—				
(1) Britannia Beach	Construction Aggregates Ltd., 231 West Esplanade, North Vancouver	Bulldozers, front-end loader, trucks, crushing, washing, screening	37	WS, RP, and SA.
(2) Furry Creek	Construction Aggregates Ltd., 231 West Esplanade, North Vancouver	Bulldozers, front-end loaders, trucks, crushing, screening	10	SA.
(3) Mamquam River	Coast Aggregates Ltd., Squamish	Front-end loader, trucks	3	RP and SA.
(4) North of Cemetery Road, Gibsons	Universal Aggregate, Box 323, Gibsons	Front-end loader, crushing, screening	2	RP and SA.
(5) Cemetery Road, Gibsons	P & W Development Co. Ltd., Box 248, Gibsons	Front-end loader, crushing, screening, readymix	1*	RP and RM.
(6) Veterans Road, Gibsons	Gibsons Building Supplies Ltd., Gibsons	Front-end loader, crushing, screening, washing	3	RP and WS=10,000 yd.
(7) South of Sechelt highway, west of Veterans Road, Gibsons	Gibsons Building Supplies Ltd., Gibsons	Front-end loader	1*	RP.
(8) Porpoise Bay Road, Sechelt	L & H Swanson Ltd., Box 172, Sechelt	Front-end loader, screening, readymix	5	RP, SA, and RM=14,623 yd.

Jervis Inlet—Treat Creek	Delta Rock Ltd., Box 1100, Coquitlam	Front-end loaders, crushing, screening	10	RP and SA=241,500 yd.
Lang Bay—1 mile north of Lang Bay	Burg & Johnson Ltd., 4728 Joyce Ave., Powell River	Front-end loader, crushing, screening, washing	2	WS=6,156 yd.
Powell River—				
(1) Off Allen Road, 3 miles northeast of Westview	P. Nassichuk, 7123 Alberni St., Powell River	Front-end loader, screening	1*	RP and S=4,206 yd.
(2) Padgett Road	Coast Paving Ltd., Box 95, Powell River	Bulldozer, crushing, screening	6*	SA.
(3) Yukon Ave., Cranberry Lake	John Sarnowski, RR 1, Powell River	Front-end loader, crushing, screening, washing	3	RP, WS, and SA.
(4) Yukon Ave., Cranberry Lake	Parsons Tractor Service		—	RP.
Vancouver Island—				
(1) Port McNeill	Island Readimix Limited		...	SA and RM.
(2) Campbell River—north of Buttle Lake Road at Elk Falls Road	Gord Noren Trucking Ltd., Box 345, Campbell River	Front-end loader	4	RP=6,430 yd.
(3) Campbell River—south of Buttle Lake Road at Elk Falls Road	C & R Concrete and Gravel Supplies Ltd., Frank Bencze	Front-end loader, crushing, washing, screening	2	RP, SA, and WS.
(4) Campbell River—south of Buttle Lake Road at Elk Falls Road	Antonelli Trucking Ltd.	Front-end loader	4	RP.
(5) Painter's Spit, Campbell River	Island Readimix Limited	High-line scraper, front-end loader, crushing, washing, screening, readymix	2	WS, SA, and RM.
(6) Cumberland Road near Courtenay	Island Readimix Limited	Bulldozer, mobile loader, crushing, screening	4	SA and RM.
(7) Parksville, 2 miles east	Fouty Bros.	Front-end loader	1	RP and WS.
(8) Parksville, 2 miles east	James Jenkins	Bulldozer, front-end loader	1	RP.
(9) Alberni	Dolan's Limited Sand and Gravel	Front-end loader, ¾-yard shovel, washing, screening, trucks	11	RP, SA, and WS.
(10) Nanaimo	Island Excavating Ltd.	Bulldozer, front-end loader	...	RP.
(11) Nanoose Bay	Canada Cement Lafarge Ltd.	Front-end loader	...	RP.
(12) Comox	R. E. Longland Trucking Ltd.	Front-end loader	2	RP.
(13) Cassidy No. 4 pit, Island Highway at Cassidy	Construction Aggregates Ltd., 231 West Esplanade, North Vancouver	Dragline, shovel, front-end loader, washing, crushing, screening	4	RP, WS, and SA.
(14) Duncan—Cowichan Lake Road	Butler Lafarge Ltd., Canada Ave., Duncan	Front-end loader, crushing, washing, screening, readymix	10	RP, WS, SA, and RM.
(15) Duncan—Koksilah	Armour & Saunders Limited, 2739 James St., Duncan	Front-end loader, crushing, screening, washing	8	RP, WS, and SA=31,283 yd.
(16) Cobble Hill	Gravel Hill Supplies Ltd., Cobble Hill	Front-end loader, washing, screening, readymix	6	RP, WS, SA, and RM.
(17) Goldstream—Sooke Lake Road at Trans-Canada Highway	Mattison and Patterson Ltd., 3421 Bonair Place, Victoria	Front-end loader, crushing, screening	1	RP and SA.
(18) Goldstream—Sooke Lake Road, ½ mile west of Trans-Canada Highway	Henson Bulldozing Ltd., 1580 Trans-Canada Highway, Victoria	Front-end loader	2	RP.
(19) Goldstream—Sooke Lake Road at Humpback Road	OK Trucking Co. Ltd., 760 Topaz Ave., Victoria	Front-end loader	1*	RP=27,000 yd.
(20) Goldstream—Turner Meadows	Nixon Ltd., 1305 Hastings St., Victoria	Front-end loader, screening	2	RP and SA.
(21) Sooke—Sooke Road east of Milnes Landing	Butler Brothers Supplies Ltd., Box 549, Sooke	Front-end loader, crushing, washing, screening, readymix	3*	RP, WS, SA, and RM.

* Part time.

Sand and Gravel Pits—Continued

Location	Operator	Equipment	Men	Production
Vancouver Island—*Continued*				
(22) Royal Bay	Construction Aggregates Ltd., 231 West Esplanade, North Vancouver	Scraper, shovel, crushing, screening, sizing	—	RP, AA, WS.
Gulf Islands—Rainbow Road, Saltspring Island	Gulf Coast Materials Ltd., Ganges	Front-end loader	1*	RP.
Creston—Goat River	Louis Salvador & Sons	Front-end loader, screening	3	WS and RP.
Wynndel—				
(1) Duck Creek	Louis Salvador & Sons	Front-end loader, screening	3	RP and RM.
(2) Duck Lake	Frank Merriam & Sons	Front-end loader, screening	3	RP and AP.
Nelson—Anderson Creek	Premier Sand & Gravel Company Limited	Front-end loader, crushing, screening	5	RP, WS, and RM.
Trail—Casino Road	McGauley Ready-Mix Concrete Company	Front-end loader, crushing, screening	4	RP, WS, and RM.
Castlegar—Columbia River	McGauley Ready-Mix Concrete Company	Front-end loader, screening	3	RP, WS, and RM.
Salmo—Erie Creek	Valley Concrete Products Ltd.	Front-end loader, screening	2	Concrete pipe.

* Part time.

SILICA

OLIVER SILICA QUARRY

By David Smith

Mining division: Osoyoos.

Location: Lat. 49°11.7′ Long. 119°33.2′ (82E/4E)
One-quarter mile west of Highway 97, 1 mile north of Oliver.

Claims: GYPO (Lot 30985).

Access: By road from Oliver.

Owner: Cominco Ltd.

Operator: PACIFIC SILICA LIMITED, 717 West Pender Street, Vancouver 1; field address, Box 39, Oliver.

Work done: These was no production from the pit in 1970. Reclaim from the stockpiles was carried out continuously, employing five men. Shipments, 3,600 tons.

SHEEP CREEK CAMP

Location: Lat. 49°09′ Long. 117°09′ (82F/3E)
See report on this property, page 441.

NEW ARLINGTON

Location: Lat. 49°13.4′ Long. 117°19.6′ (82F/3W)
See report on this property, page 441.

TRIXIE V

Location: Lat. 49°15′ Long. 117°19.5′ (82F/6W)
See report on this property, page 440.

HUNT

By J. W. McCammon

Mining division: Golden.

Location: Lat. 51°12.6′ Long. 116°51.8′ (82N/2W)
Between 3,100 and 4,100 feet elevation, at the mutual junction of Sections 9, 10, 15, and 16 of Township 26, Range 21, west of the 5th meridian, one-quarter to 1 mile south of Horse Creek, and 1 mile east of Highway 95, 7.3 miles southeast of Golden.

Claims: Lot 1540, consisting of the HUNT 4A, 5A, 6A mineral claims.

Access: By 1.2 miles of abandoned logging-road east and north from Campbell Road at a point 1 mile east and south from Highway 95 at the Horse Creek bridge.

Owner: C. WARREN HUNT, 1119 Sydenham Road, Calgary 3, Alta.

Description:

The claims cover an area underlain by pure quartzite of the Ordovician Mount Wilson (formerly Wonah) Formation, associated with dolomite of the Beaverfoot Formation.

On the property the ground rises from a flat area in the southwest to an irregular knob and gully region on the east. The knobs tend to be bare with bedrock well exposed, while the remainder of the area is covered with trees and brush and reveals little outcrop. The south faces of the knobs form steep cliffs.

The three claims are in tandem astride the east boundary lines of Sections 9 and 16, with No. 4A at the south and No. 6A at the north. Quartzite is well exposed in patches that cover about 10 per cent of No. 4A claim near its centre, about 20 per cent of No. 5A claim in the north central part, and about 25 per cent of No. 6A claim in the east half. Undoubtedly it also underlies considerably more ground now covered, particularly on claims 5A and 6A. Dolomite outcrops over about 7 per cent of claim 4A, chiefly in the central part of the east side and toward the northwest corner, and 20 per cent of claim 5A in the southeast corner.

The quartzite is hard, firmly cemented, pale grey to white or light-buff coloured rock. It weathers dull white. In three thin-sections examined it was seen to consist essentially of quartz grains in a silica cement with very few scattered grains of magnetite, mica, and other minerals. The diameters of the quartz grains range from 0.12 to 0.85 millimetre, with most being about 0.25 or 0.50 millimetre. The original grains were subrounded to well rounded, but during lithification the silica cement formed irregular growths on the grains so they now have angular shapes. The rock in exposed faces is massive and does not show bedding.

The dolomite is fine-grained, grey, thin-bedded rock with inclusions and layers of grey chert and many fossils, particularly cup corals. It forms one hump on No. 5A claim separated by sharp gullies from quartzite on the north and more dolomite on the south. The beds strike north 40 degrees east and dip 32 degrees northwest. The second dolomite hump, on No. 4A claim, overlies quartzite to the south, the beds striking north 80 degrees west and dipping 35 degrees northeast.

The rocks have obviously been disturbed by faulting with the quartzite on claims 5A and 6A being in a block up-faulted relative to other areas, and the dolomite on claim 5A in a block down-tilted to the northwest.

Three samples were collected for chemical analysis. Sample 1 consisted of equal-sized chips gathered at random from an area about 100 feet in diameter on top of the bare bluff in the southeast corner of claim 6A. Sample 2 was collected in a similar manner from the top of the bare bluff at the centre of claim 5A, and sample 3 similarly, from the bare bluff near the centre of claim 4A. The analyses, expressed in percentages, are shown below.

Sample	SiO_2	Fe (Total)	Al_2O_3	CaO
1	98.76	0.07	1.13	*Nil*
2	97.94	0.05	1.25	*Nil*
3	98.24	0.05	0.85	*Nil*

Work done: These claims were recorded in November 1968 by C. W. Hunt. They were legally surveyed in October 1969. No other work has been recorded.

SCUZZY CREEK

Mining division: New Westminster.

Location: Lat. 49°50′ Long. 121°35′ (92H/13E)
Between 2,200 and 3,200 feet elevation along Scuzzy Creek, approximately 12 to 17 miles west of its confluence with the Fraser River.

Claims: LYN 1 to 5, MIN 1, MIDGE 1 to 20, 21 Fraction.

Access: By gravel road from Boston Bar, 12 to 17 miles.

Owner: INDUSMIN LIMITED, 7 King Street East, Toronto 1, Ont.

Description: Entire highland surrounding Scuzzy Creek consists of coarse-grained quartz diorite, making area ideal setting for exploration for quartz and plagioclase.

WORK DONE: Surface geological mapping, 1 inch equals 200 feet on part of one claim; stripping, test pits on Lyn 1, 2, 4, 5, and Midge 2, 10 to 12, 14, 16, 18; overburden drilling, 16 holes totalling 225 feet on Lyn 1, 2, 4, 5, and Midge 11, 12, 16, 18.

BUSE LAKE QUARRY

By E. Sadar

MINING DIVISION: Kamloops.

LOCATION: Lat. 50°37.3′ Long. 120°01.5′ (92I/9E)
At the southeast corner of Buse Lake, 14 miles east-southeast of Kamloops.

ACCESS: The quarry is reached by 7 miles of gravel road from the Trans-Canada Highway, approximately 12 miles east of Kamloops.

OPERATOR: CANADA CEMENT LAFARGE LTD., Box 728, Kamloops.

WORK DONE: Siliceous volcanic tuff containing 67.12 per cent silica and 15.78 per cent alumina is mined and shipped to the Canada Cement Lafarge company cement plant at Kamloops under contract by Plateau Construction Limited. Rock shipped, 10,350 tons.

REFERENCE: Mines Branch Publication No. 452, Building and Ornamental Stones of Canada, Pt. V, 1917, *Canada Dept. of Mines*, Ottawa, p. 180.

SODALITE

WATERLOO

LOCATION: Lat. 51°11.5′ Long. 116°22.5′ (82N/1W)
See report on this property, page 467.

CHAPTER 5

Coal

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GENERAL REVIEW OF COAL MINING AND EXPLORATION

By A. R. C. James

The year 1970 saw continued large investments of capital by many companies for coal exploration and coal-production facilities in British Columbia. This has resulted from the opening-up of large Japanese markets for western Canadian coking-coals and from the changing world outlook for coal as an energy source. At the end of the year two companies held 15-year contracts for the shipment of coal to Japanese steel interests. Kaiser Resources Ltd., whose main contract commenced on April 1, 1970, has agreed to ship approximately 5 million long tons per year. Fording Coal Limited, whose contract commences on April 1, 1972, is to deliver 3 million long tons per year.

The total amount of coal mined (gross production) in 1970 was 3,483,062 short tons, a three-fold increase of the 1969 production. Of this amount 2,644,056 short tons were sold and used. Almost all this production was from the mines operated by Kaiser Resources Ltd. at Michel. The first shipment by unit train to Roberts Bank left Sparwood on April 28.

Extensive exploration and development has continued during the year in the Elk River coalfield. This field extends for some 58 miles from Alexander Creek to Elk Pass on the Alberta boundary. On the Fording Coal property, extensive coal reserves have been established and the property is being prepared for production commencing in April 1972. A crew of several hundred men has been employed on construction and preparatory work through most of the year. North of the Fording Coal property in the vicinity of Aldridge Creek, Emkay Canada Natural Resources Ltd. has carried out exploration which has indicated large coal reserves. Farther south in the Line Creek-Horseshoe Ridge area, Crows Nest Industries Limited has been active in exploration and it is reported that large reserves of coal have been indicated by drilling and examination of seam outcrops.

Another area which is receiving intensive examination for the first time by coal-prospecting parties is the belt of Lower Cretaceous coal-bearing rocks (specifically the Gething and Commotion Formations) which are known to extend for some 200 miles through the eastern foothills of the Rockies from the Alberta boundary near the Narraway River through the Pine and Peace Rivers to the Halfway River. One company, Brameda Resources Ltd., has diamond drilled an area of 8 square miles near Sukunka River and is said to have established reserves of over 60 million tons of high-grade coking-coal under potentially very good mining conditions. Other companies are, generally speaking, in the stage of preliminary exploration.

The Groundhog coalfield, situated in the heart of northern British Columbia, received a detailed geological examination. The coals in this field are almost entirely anthracites and semianthracites. Although this field has been long believed to be geologically not very favourable for mining operations, the new and more detailed work seems to show a more encouraging picture. With the Pacific Great Eastern Railway constructed only 175 miles away and due to pass through the coalfield, the economic outlook for this area may be improving.

A record number of coal licences was issued under the *Coal Act* in 1970. By the end of the year 1,442 coal licences were in good standing, covering no less than 685,875 acres.

REPORTS ON COAL MINES

EAST KOOTENAY INSPECTION DISTRICT

By R. W. Lewis

During 1970, 3,480,631 tons of coal was produced in the East Kootenay District. No coal was produced from the British Columbia side of the Tent Mountain open-pit operation. Fairly extensive exploration programmes were conducted in the Elk and Fording River valleys, and to a lesser extent in the Flathead area, details of which follow.

Kaiser Resources Ltd., while maintaining normal levels of coal and coke production at Michel, increased their rate of coal production considerably with the commencement of production at the new open-pit complex on Harmer Ridge. On April 28, 1970, the first coal shipment by unit train left the Kaiser Resources Ltd. loading point at Sparwood for Roberts Bank coal terminal at Vancouver.

Coal production at the Michel Colliery during the year was from both underground mines and surface open pits. The underground mines produced from the Balmer "A" and "D" seams, and the surface open pits, from the Balmer No. 3 and No. 7 seams. A description of the various underground and surface mining operations is included in this report.

There was one fatal accident at Michel Colliery during the year, and one dangerous occurrence. There was one fatal accident on Harmer Ridge involving a mining company employee, and one involving a construction worker. There was one other fatal accident in the district, involving an assistant driller employed on coal-exploration work under contract to Crows Nest Industries Limited. These accidents and dangerous occurrences are described fully in the Annual Report of the Minister of Mines and Petroleum Resources.

The East Kootenay Mine Safety Association held its 49th annual mine rescue and first aid competitions at Kimberley on May 30, and the various competitions were well attended. Four teams entered the mine rescue competitions, two from Kimberley, one from Michel, and one from Fernie. The Department of Mines and Petroleum Resources trophy was won by the Sullivan mine team, captained by A. Burrows. The senior men's first aid competition was won by the Crows Nest Industries Limited team from Fernie, captained by W. Williams. The team went on to compete at the Provincial competitions held at Nelson in June.

KAISER RESOURCES LTD.

H. M. Conger, general manager; J. E. Korski, open-pit manager; R. E. Sieling, manager of underground mines; J. Lawrie, senior mining engineer.

The open-pit operation on Harmer Ridge and the new coal-preparation plant in the Elk Valley came into operation during the early part of the year, considerably increasing the total coal production from the East Kootenay District. Michel Colliery operated throughout 1970 at a production level comparable with former years. One significant change in the method of coal production at the colliery took place toward the end of the year, this being the introduction of the hydraulic method of coal mining.

Throughout the year the company continued to devote special attention to its reclamation programme. The company purchased a 1,500-gallon hydroseeding machine capable of jetting mixtures of water, peat, grass seed, and fertilizers a distance of 150 feet in any direction. They also established a small tree farm and built and equipped a large, heated greenhouse. By the end of 1970, a total of 880 acres of the property had been hydroseeded, and some 40 acres of tree planting completed, with fairly encouraging results to date.

HARMER RIDGE OPEN PITS AND COAL-PREPARATION PLANT—J. E. Korski, open-pit superintendent; W. L. McMorris, coal-preparation plant superintendent; G. H. Henderson, maintenance superintendent.

In the general area known as Harmer Ridge, the company conducted mining operations in the Harmer Knob, Harmer No. 1, Dry Creek, and Camp Eight open pits.

During April, a Page dragline was put into service in the Harmer No. 1 open pit, which was then worked by a combination of dragline, shovel, and truck, whereas the other three open pits were worked by shovel and truck only.

A total of about 9,000 tons of explosives was used during the year, to prepare some 23 million cubic yards of overburden. This uncovered approximately 3¼ million tons of run-of-mine coal that was loaded and conveyed through the mountain to the Elkview coal-preparation plant near Sparwood.

The following list of additional equipment was assembled and put into operation in the open pits during the year:

One M200 Unit-Rig 200-ton truck.
Ten M100 Unit-Rig 100-ton trucks.
Four D9 Caterpillar tractor dozers.
Two Model 16C road graders.
One Model D600 KW Dart front-end loader.

Raw coal from the open pits was delivered by trucks to the breaker station, where it was reduced to a 4 to 0-inch size range. The coal was then conveyed through a mile-long tunnel to the four raw-coal silos having a capacity of 8,000 tons. The coal was then conveyed into the coal-preparation plant where it was separated for treatment into four different size ranges. The 4 to ⅜-inch coal was treated in a heavy medium magnetite washer, the ⅜-inch 28-mesh coal was treated in heavy media cyclones, the 28 to 100-mesh size range was treated in hydrocyclones, and finally the minus 100-mesh coal was treated in the flotation plant.

The clean coal in the size range ⅜ to 0-inch was dried in a fluid-bed thermal coal-drier and added to the clean, coarse coal for storage in the clean-coal silos. The unit trains were automatically loaded as they were hauled through the loading station at the base of the clean-coal silos.

Coarse refuse from the plant was hauled by scrapers to the spoil area, where it was layered and compacted. The minus 28-mesh tailings were fed into tailings impoundments.

The first coal was put through the preparation plant in March 1970, the first shipment by unit train from the plant was on April 28, 1970, and by the end of the year the average hourly input to the plant had reached 1,000 tons.

The total manpower at the end of the year at the new open-pit mining operation, including the coal-preparation plant and maintenance complex, was 759.

MICHEL COLLIERY—R. E. Sieling, mine manager; J. Anderson, senior mine overman; D. Anderson, mechanical superintendent; F. Fairclough, electrical superintendent; C. Chakravatti, ventilation engineer.

This colliery, which has been in operation since 1899, is at Michel, some 24 miles northeast of Fernie. Production from the Michel Colliery during 1970 was obtained from four underground mines and five open pits. The coal-preparation plant and the by-product plant are on the colliery site at Michel. The mines are on both sides of the Michel Valley at various elevations, having been opened mainly from the seam outcrops. For the past decade the underground mines have been

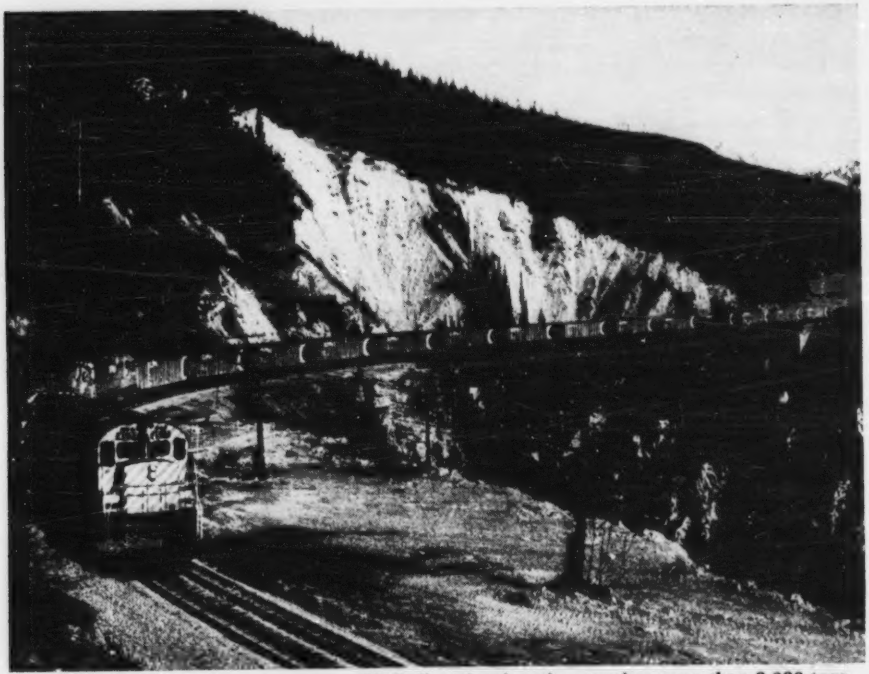

Plate XXIA.—Coal on the move. CP Rail coal unit train, carrying more than 9,000 tons of metallurgical coal, crosses Stoney Creek bridge in British Columbia on its 700-mile journey from the Kaiser Resources Ltd. mine at Sparwood to the new Pacific superport at Roberts Bank. Six of these 88-car trains, operating on 72-hour roundtrip schedules, eventually will bring more than 5,000,000 tons of export coal a year into Roberts Bank.

(Courtesy of CP Rail.)

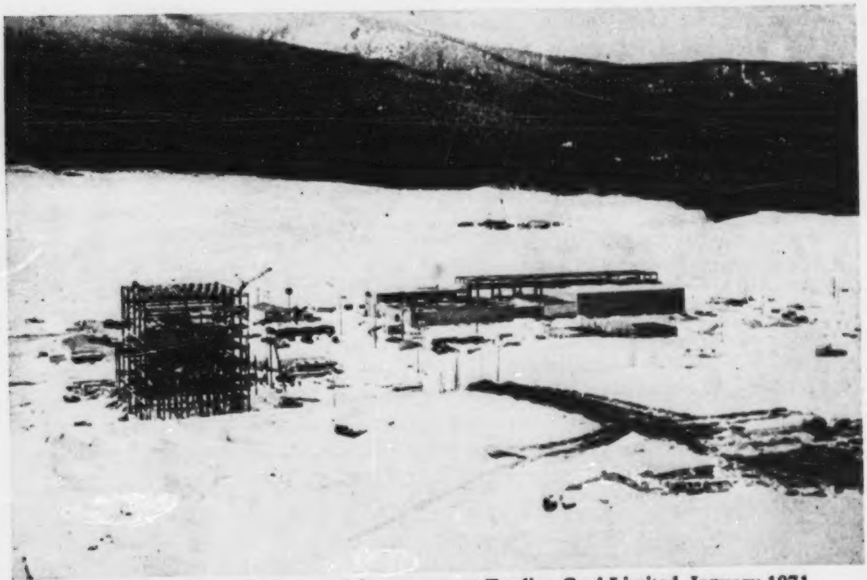

Plate XXIB.—Construction work in progress at Fording Coal Limited, January 1971.

worked by mechanized room-and-pillar methods; however, in the latter part of 1970 a start was made on hydraulic coal mining in one of the mines.

Underground equipment was operated mainly by electricity, and all the equipment was of the flame-proof type approved for use in coal mines. Underground transportation of coal was by shuttle cars and fast-moving belt conveyors. Underground transportation of supplies and materials was by means of rubber-tired vehicles operated by diesel or battery units.

During 1970, at Michel Colliery and the exploration sites, a total of 28,525 pounds of Monobel and 375 pounds of CXL-ite explosive was used. In conjunction with this, 45,600 electric detonators were used, with no reported misfired shots. A total of 3,069 tons of limestone rock dust was spread in the underground mines to minimize the coal-dust explosion hazard. Regular monthly dust samples were taken in all the mines in accordance with the requirements of the *Coal Mines Regulation Act*. These samples were analysed and the results made available for scrutiny.

Monthly examinations of workings at the mines were made by the miners' inspection committee, and regular safety meetings were held each month in the mine office. Reports kept at the mine in compliance with the *Coal Mines Regulation Act* were checked periodically and found to be in order.

At the end of the year 441 men were employed at Michel Colliery, 233 on the surface and 208 underground. Sufficient overmen and firebosses were employed to ensure that safety inspections and work supervision were conducted in accordance with the requirements of the *Coal Mines Regulation Act*. A description of the underground mining operations follows.

Underground Mining Operations

Balmer North Mine—William Davey, overman. This mine, in the No. 10 seam, is on the north side of Michel Valley. It is entered by two rock tunnels, each 1,150 feet long, which were driven by February 1966. The mine portals are at an elevation of 3,850 feet, 1 mile west of the coal-preparation plant, and can be reached by private access road. The coal seam is about 50 feet thick, dips at an angle of 15 to 20 degrees to the southwest, and is overlain by a fairly strong shale roof. The coal was mined by continuous-miner machines, then loaded onto shuttle cars and transported from the mine by a trunk belt-conveyor system.

The mine had a daily production of approximately 1,300 tons of saleable coal during 1970. Three continuous miners produced coal from different sections of the mine. Each section is ventilated by a separate split of ventilation. Most of the mine output was obtained from driving rooms immediately underneath the hangingwall of the seam along the strike direction. The rest of the mine output was obtained from a method of partial pillar extraction, by widening rooms, and further shrinking into the thick seam of coal.

The ventilation of the mine was provided by a Joy 400-horsepower mine fan operating at a water gauge of 6 inches installed on and exhausting from the top of the 16-foot diameter vertical air shaft. The mine fan provided about 360,000 cubic feet per minute of air. The main return airway, at the bottom of the air shaft, contained on average about 0.6 per cent methane during normal working conditions. Cold-weather problems during the winter months were overcome by the use of two Flamemaster mine air-heating units at the portals of the two rock tunnels.

Ventilation of the working faces was mostly by auxiliary fans and flexible ducting, and sometimes by a combination of fan and ducting with line brattice. During the year, each working face was equipped with a constant running methanometer, preset to give the continuous-miner operator warning when the methane content at the face reached a level of 1 per cent.

The standard of limestone rock-dust application in the underground roadways of the mine was good throughout the year, resulting from the regular and sometimes continuous use of several rock dust sprinkle-dusting machines. In accordance with the provisions of Rule 90 of the *Coal Mines Regulation Act*, 12 separate sets of water barriers were used at various locations in the mine. These are used in coal mines to stop the propagation of underground methane-air or coal-dust explosions.

The results of airborne dust surveys conducted by the Environmental Control Branch of the Department of Mines and Petroleum Resources in 1970, while being better than in previous years, still indicate that there is much progress to be made in the future in the field of airborne dust control. The company now conducts its own airborne dust surveys using the gravimetric sampler, and the results of the surveys are submitted to the Department of Mines and Petroleum Resources.

The Balmer North mine was inspected regularly throughout the year, and general conditions were found to be fairly satisfactory.

Balmer Hydraulic Mine—Arnold Webster, overman; Arthur Grimley, overman. This mine, operating in the No. 10 seam, is on the south side of the valley, approximately 1 mile west of the coal-preparation plant at Michel. The mine was opened in 1969, with two main entries driven from the outcrop of the No. 10 seam on the mountainside. The development of this mine was primarily to explore the possibilities of working by hydraulic methods this thick, inclined seam of coal. The main entries airways and the first sublevels had been driven by the beginning of 1970. The installation of the underground plant was completed during the early part of the year, but as a result of considerable delay in the construction of the surface dewatering and coal-handling plant, mining by the hydraulic method was not commenced until November.

A team of mining engineers and machine operators from the Mitsui Mining Company of Japan arrived in Michel in November 1970. These persons were engaged by Kaiser Resources Ltd. in order to teach and train the coal personnel in this new method of coal mining. The Mitsui Mining Company has had considerable experience in this method of coal mining in a number of their coal mines in northern Japan.

In this type of mining the coal is cut off the solid by a high-pressure jet of water directed at the coal face by a hydraulic monitor. The same water is then used to transport the broken coal in semicircular steel troughs, outbye along the mine roadways to the surface dewatering plant. The surface plant is designed to work on a closed-circuit principle, using a thickener and a filtration plant for recovery of fine coal and thus permitting the reuse of the same water in the mine. This method of coal mining has considerable merit, and the results obtained during the last two months of 1970 were fairly encouraging.

Ventilation for the mine was provided by a 100-horsepower electrically driven axivane mine fan, which delivered approximately 100,000 cubic feet of air per minute at a water gauge of 3 inches. Through ventilation was provided in the hydraulic sublevels, with fresh air passing over the operating team, through the worked out areas, and to the main return airway via bleeder levels. The mine remained free of methane gas, and at no time during the year could methane be detected on either the flame safety lamp or methanometer.

"D" Seam, North Mine—Henry Eberts, overman. This mine was opened in October 1969 to work an area of the "D" seam on the north side of the Michel Valley. The mine entries were formed at the coal-seam outcrop at an elevation of 5,300 feet. At this location the "D" seam is about 8 feet thick, dips 12 degrees southwesterly, and is overlain by approximately 100 feet of cover to the surface.

Mining has indicated unfavourable working conditions in "D" seam, with constant variations in seam section and a very weak and friable hangingwall. The company continued to operate the mine, hoping for improved mining conditions, but eventually closed it in March 1970.

"A" Seam North, No. 2 Mine—Henry Eberts, overman. This mine was opened in March 1970 to work an area of the "A" coal seam on the north side of the Michel Valley. The portals are at an elevation of approximately 5,000 feet and are accessible from a private road leading from the coal-preparation plant at Michel. The mine entries were formed at the seam outcrop by using a continuous-miner machine. The coal seam averages about 12 feet thick, and dips 15 degrees southwesterly.

The mine was ventilated by a 100-horsepower axivane electrically driven fan, capable of providing 90,000 cubic feet of air per minute at a working water gauge of 1.5 inches. Ventilation of the advancing rooms was provided by a 15-horsepower auxiliary fan in conjunction with flexible ducting.

The mine had a daily production of 400 tons of saleable coal from April to the end of the year. Rooms were driven by continuous miners, but no pillars were extracted. The coal was transported by shuttle cars and fast-moving belt conveyors to the loading point outside the mine. This mine was closed at the end of the year, when the main development headings encountered a complete wash-out of the coal seam, which persisted over a very extensive area.

OPEN-PIT MINING OPERATIONS

J. Lawrie, mining engineer; J. Anderson, superintendent. These open pits are quite separate from the new operation in the vicinity of the Harmer Ridge, and the mined coal is treated at the Michel coal-preparation plant. Open pits which produced during 1970 were No. 10 seam, 7 pit; No. 10 seam, 6 pit; No. 10 seam, 4A pit; No. 3 seam pit; and No. 7 seam pit. These open pits are at fairly high elevations on both sides of the Michel Valley, and are served by private mining-roads leading from the coal-preparation plant at Michel. A brief description of each open pit follows:

No. 10 seam, 6 open pit—This open pit was brought into operation in the spring of 1968 for the mining of an area of the No. 10 seam at McGillivray, off the south side of the Michel Valley. Access to the pit from the coal-preparation plant is by 4 miles of public road and a further 3 miles of private road. Operations at the open pit were spasmodic during 1970 and coal production was low. All operations at this open pit were conducted by a contractor.

No. 10 seam, 7 open pit—This open pit, at an elevation of 4,900 feet, is approximately 3 miles south of Sparwood on the east side of the Elk Valley. Coal mined at the open pit was hauled by contractor over 5 miles of private road to the coal-preparation plant at Michel. Operations in the open pit were carried out by Emil Anderson Ltd. under contract to Kaiser Resources Ltd.

No. 10 seam, 4A open pit—This open pit, at an elevation of 5,000 feet near Camp Eight open pit on Harmer Ridge, had access to the preparation plant at Michel by 5 miles of private road. Operations in this open pit were stopped very early in 1970 because of its close proximity to the new open pit mentioned above. Work in the pit was carried out by Emil Anderson Ltd. under contract to Kaiser Resources Ltd.

No. 3 seam open pit—This open pit, situated on Natal Ridge at an elevation of 5,000 feet, is approximately 2½ miles north and west of Michel. Operations started in the spring of 1967, and coal was produced continuously until the open pit was closed in the spring of 1970. During March 1970, a failure of the main pit wall occurred and all activities other than certain protective measures ceased. Kaiser Resources Ltd. rock mechanics engineers and an independent firm of geotechnical engineers made a close investigation of the failure. Energy dissipation berms were constructed over continuous areas at 350 and 850 feet from the toe of the pit wall. Observations of movement were maintained, and showed a rapid slowing down of movement during April and May 1970. The examination by the firm of geotechnical engineers carried out in November 1970 indicated that sudden stress release would be unlikely. It was also noted that any rock falls would be absorbed by the relatively flat footwall and by the energy-dissipation berms.

No. 7 seam open pit—This open pit, on the Natal Ridge, at an elevation of 4,800 feet, is approximately 2 miles southwest of Michel. The coal seam is 31 feet thick and contains a 6-foot dirtband about 8 feet above the footwall. Operations were spasmodic during 1970 and production low.

PROSPECTING AND EXPLORATION

J. B. Murphy, geologist. During 1970, the company embarked upon a much-expanded exploration programme, under the direction of J. B. Murphy, exploration geologist. For most of 1970 approximately 50 men, including supervisory staff, were engaged in this programme. The work was carried out in the Elk Valley coal lands, the Crows Nest coalfield, and the immediate mining areas around Michel. Work done included both rotary and core drilling, the driving of prospect adits, construction of access roads, and the tracing and mapping of coal-seam outcrops. The following is a summary of physical work completed on the Crows Nest property and on coal licence lands:

(*a*) 39 miles of access roads constructed;
(*b*) 29,364 feet of exploratory drilling (Michel area);
(*c*) 7,806 feet of drilling (Hosmer area);
(*d*) 31 prospect adits, including 6,150 feet of drifting and crosscuts;
(*e*) 15 miles of coal outcrop exposed.

MICHEL COAL-PREPARATION PLANT

G. Lancaster, superintendent. This plant is on the colliery site near the entrance to the old rock tunnels on the south side of the Michel Colliery. It was built in 1936, and a description of the mode of operation has been given in past Minister of Mines and Petroleum Resources Annual Reports. During the year, natural gas was introduced for the firing and operation of the thermal coal-dryer. This displaced the old method using pulverized fuel, and has contributed to the reduction in airborne dust problems.

BY-PRODUCT PLANT

G. Lancaster, superintendent. This plant is situated near the coal-preparation plant. During the year the plant employed approximately 56 men. Present operations are confined to the horizontal-fired Curran-Knowles ovens, a detailed description of which has been given in previous Annual Reports. The plant produced a total of 170,686 tons of coke and 20,290 tons of breeze in 1970.

COLEMAN COLLIERIES LIMITED

(49°114°NW.) M. Bianchini, foreman. This company has been operating an open pit on Tent Mountain, and has produced coal since 1952. Most of the operations have been carried out on the Alberta side of the interprovincial boundary, but coal has been produced in the No. 4 open pit on the British Columbia side. There were no activities in the No. 4 open pit and there was no coal produced during 1970.

FORDING COAL LIMITED

(50°114°NW.) R. M. Porter, president; O. I. Johnson, general superintendent; J. B. Donald, superintendent, mining; M. Malnarich, superintendent, processing; G. W. Lee, superintendent, shops and services; R. W. Zeindler, production superintendent; G. Lokhorst, mine engineer; A. C. Taplin, mine geologist.

This company, in conjunction with Canpac Minerals Limited, holds 75 coal licences in the Fording Valley area. Access to the property is via 23 miles along the Elk Valley to Boivin Creek, then 7 miles easterly to the Fording River and 11 miles north along the upper Fording Valley.

The company has secured markets in Japan for large tonnages of metallurgical coking-coals, and production at the rate of 3 million long tons per year is scheduled to commence early in 1972. Throughout 1970 the company was engaged in mining exploration, mining pre-production, and site construction.

Coal-exploration work was conducted during 1970 on Turnbull Mountain, Eagle Mountain, Castle Mountain east of the Fording River, and in the Greenhills area west of the Fording River. Diamond drilling (HQ core) totalled 10,080 feet in 19 holes and rotary drilling totalled 4,790 feet in 10 holes. Core and chip samples were taken for analysis and coal-washing tests. Sixteen miles of bulldozer seam-tracing was done along the seam outcrops.

In order to provide detailed information for pit planning and scheduling, extensive drilling was carried out at the proposed Clode pit on the north end of Eagle Mountain and at the Greenhills pit area. Rotary drilling totalled 38,546 feet in 103 holes, while additional diamond drilling totalled 3,731 feet in four holes.

Major minesite road construction was completed and consisted of 4 miles of 70-foot main haul roads, 2 miles of Clode in-pit haul roads, plus several miles of ancillary plant roads.

Heavy mine equipment assembled at the site consisted of two rotary blast-hole drills, two 15-cubic-yard shovels, five tractors, one grader, plus a 15-cubic-yard front-end loader. The tub section was completed for a 60-cubic-yard dragline, and at the year-end assembly of a number of mine trucks was under way.

Construction and design activities reached a peak near the end of the year, when the crew resident at the mine camp-site totalled 400. Major excavation work included preparation of raw-coal storage area, tailings dam construction, rail spur-lines, water and sewer works, and site drainage. Steel erection for the shops complex and coal-preparation plant was well advanced, general office framing completed, and excavations carried out for ancilliary plant buildings.

The main power-line from the Elk Valley was erected, plantsite distribution lines completed, and primary substation prepared for the main transformer installation early next year. Standby construction power was provided by one 75-kw., one 150-kw., one 250-kw., and two 500-kw. diesel-generator units. The permanent British Columbia Telephone communication system was tested and should be in full operation early in 1971. The permanent road servicing the project from Boivin Creek in the Elk Valley was improved by relocation and upgrading. The Canadian Pacific Railway contractor made steady progress on the 34-mile spur-line north from Natal.

By late fall, servicing was completed for 37 mobile-home residents at the newly developed community of Elkford at Boivin Creek west of the Elk River and 18 miles south of the minesite.

With regard to the over-all rehabilitation of future mined land, the Cominco Ltd. research reclamation programme launched early in 1969 continued and included growth-chamber tests on typical mine waste material, determining effect of climatic conditions and nutrient requirements on seeded mine-area test plots, hydroseeding tests of road embankments, plus ecological studies by the British Columbia Research Council.

CROWS NEST INDUSTRIES LIMITED

(49°114°NW.) W. R. Prentice, president; J. J. Crabb, exploration manager.

During 1970, exploration work was carried out at Lime Creek Ridge, Horseshoe Ridge, and Ewin Mountain. The field crew continuously employed consisted of a geologist, two surveyors, one field supervisor, two firebosses, and four miners. All bulldozing and drilling was done under contract to and supervised by Crows Nest Industries Limited.

A total of 16.5 miles of access road was constructed on the company's property, 8.2 miles of seam tracing and trenching, and two test pits amounting to 83,000 cubic yards were excavated.

Fifty-five exploration boreholes totalling 36,287 feet were drilled and 51 were logged.

Prospect adits and crosscuts totalling 2,868 feet were driven.

EMKAY CANADA NATURAL RESOURCES LTD. and SCURRY-RAINBOW OIL LIMITED

(50°114°NW.) J. A. Harker, vice-president, Morrison-Knudsen Company Inc.; N. C. Croome, vice-president, Scurry-Rainbow Oil Limited; J. H. Bailey, vice-president, Elk River Explorations Ltd.

At the end of 1969, Scurry-Rainbow Oil Limited granted Morrison-Knudsen Company Inc. an option to acquire an undivided one-half interest in their Elk River coal holdings. Morrison-Knudsen exercised this option and assigned the option to Emkay Canada Natural Resources Ltd.

On July 15, 1970, Elk River Explorations Ltd. set up a 30-man camp at the junction of Aldridge Creek and Elk River, 50 miles north of Natal. The camp was winterized and exploration work was continued until the end of the year, with the intention of continuing throughout the winter. Existing roads were made serviceable and new drill roads were completed to the sites of about 60 drill holes. These holes were drilled, utilizing both rotary drilling with electric logs for seam location and core drilling coupled with electric logs. The following drilling was completed by the end of the year: (*a*) Rotary drilling, 6 to 3¾ inch, 30 holes, 6,232 feet; (*b*) core drilling, NX, 28 holes, 16,984 feet.

In addition, seven old adits were extended and two were collared in coal seams for bulk samples. Another bulk sample was obtained from a deep dozer trench and several additional dozer trenches were either deepened or dug for seam location and oxidation studies.

A rock crosscut 27 feet long was driven into the footwall of the bottom mining seam in a new programme to help evaluate the strength of the final mine slope.

RIO TINTO CANADIAN EXPLORATION LIMITED

Rolands A. Benkis, exploration manager. During 1970, Rio Tinto Canadian Exploration Limited investigated two areas in the East Kootenay District of British Columbia, one in the Upper Elk Valley and the other in the Flathead Valley near the Montana border.

During June and part of July, geological mapping and coal prospecting were conducted in an area near the headwaters of the Elk River. The work was done over coal licences 572 to 587, inclusive; 798 to 800 and 1012 to 1018, inclusive. In addition to mapping and prospecting, a limited amount of hand-trenching was also done.

In September 1970 the company optioned a coal prospect in Flathead Valley, the property going under the name of Sage Creek Coal Limited. To date the activities have been concentrated in an area north and south of Cabin Creek on Coal Licences 374, 375, 376, 383, 386, 388, 392, 393, 396, and 405. Geological mapping, trenching with a bulldozer, and some diamond drilling were in progress up to the end of the year.

NORTHERN INSPECTION DISTRICT

BRAMEDA RESOURCES LTD. (SUKUNKA RIVER PROJECT)

By A. D. Tidsbury and A. R. C. James

LOCATION: Lat. 55°12′ Long. 121°35′ (93P/4E)
Thirty-six miles south of Chetwynd, on the westerly slope of Bullmoose Mountain at Skeeter and Chamberlain Creeks.

LICENCES: One hundred and forty-six coal licences, covering 93,440 acres.

ACCESS: By forest access road, 36 miles up the east bank of the Sukunka River.

OWNER: BRAMEDA RESOURCES LTD., Seventh Floor, 1177 West Hastings Street, Vancouver 1.

DESCRIPTION:

This company holds 146 coal licences in northeastern British Columbia, extending from the vicinity of Wolverine Creek and Mount Spieker in the south to Burnt River in the north. The area at present under exploration lies to the west of Bullmoose Mountain, east of Chamberlain Creek, and south of Skeeter Creek. These two creeks are tributaries of the Sukunka River.

Approximately 8 square miles has now been explored in some detail by examination of outcrops and by diamond drilling at approximately 2,000-foot intervals. The area is underlain successively by sediments of the Lower Cretaceous Gething, Moosebar, and Commotion Formations. The structure appears to be regular, with flat to very gentle dip, but with some indications of moderate thrust faults in some areas. Coal seams have been intersected in the Gething Formation, a composite section of which comprises over 1,000 feet of sandstones, siltstones, shales, and occasional conglomerate. The most attractive seam economically occurs about 180 feet from the top of the Gething Formation and has been designated the Chamberlain seam. The average thickness of this seam is about 8.5 feet of clean coal with no rock bands. The seam is continuous over a wide area, the cover of overlying rock ranging from zero at the outcrop to about 1,700 feet on the east side of the property. The characteristics of the coal are those of a medium volatile high-grade metallurgical coking-coal with low sulphur content and high free-swelling index. It is understood that reserves are currently estimated at 60 million tons.

WORK DONE: Forty-four NQ diamond-drill holes were completed, with a total footage of 49,500 feet. Drilling was on a two-shift, seven-day-week basis, utilizing two Connors drilling-rigs. Three adits were driven in the Chamberlain seam to provide bulk samples for testing purposes. Combined footage is 360 by 9 by 14-foot-wide headings. A new camp was erected and winterized. Electricity for power and lighting is provided by a 35-kw. generator. A total of 45 miles of drill-site access road was constructed during 1970. There was a peak roster of 37 men employed.

REFERENCES: *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, pp. 423–425; *Geol. Surv., Canada,* Paper 61-10, Dawson Creek Map-Area; Map 19-1961.

McINTYRE PORCUPINE MINES LIMITED

By A. R. C. James

LOCATION: Lat. 54°50′ Long. 120°50′ (93I/8, 9, 10, 15)
The coal licences extend along the eastern foothills of the Rocky Mountains from Narraway River to Kinuseo Creek, a distance of 50 miles. A small block of licences is also held south of the Pine River in the vicinity of Falling Creek.

LICENCES: One hundred and forty-four coal licences covering 90,280 acres (140 square miles).

ACCESS: By helicopter from Prince George, 100 miles, or by road from Beaverlodge, Alta., 80 miles.

OWNER: McINTYRE PORCUPINE MINES LIMITED, 312, 409 Granville Street, Vancouver 2.

DESCRIPTION: A large part of the licence area is believed to be underlain by the potentially coal-bearing Lower Cretaceous Gething and Commotion Formations.

WORK DONE: Reconnaissance of the licence area was carried out, which has resulted in coal seams being observed in the Gething and Commotion Formations.

TREND EXPLORATION LIMITED

By A. R. C. James

LOCATION: Lat. 56°00′ Long. 122°45′ (94B/2)
The company holds three blocks of coal licences between the Peace River and the Moberly River—one in the Carbon Creek-Beatty Peak area, one between Carbon Creek and Mount Gething, and a third east of Mount Gething. A fourth block of licences is situated north of the Peace River in the Butler Ridge-Dunlevy Creek area.

LICENCES: One hundred and forty-three coal licences in northeastern British Columbia, covering 89,753 acres (139 square miles).

ACCESS: By road and trail from Fort St. John or from Highway 97.

OWNER: TREND EXPLORATION LIMITED, 610, 540 Fifth Avenue SW., Calgary 1, Alta.

DESCRIPTION: The licences are situated in what is probably the longest and best-known area of the northeastern coalfield. The licences are extensively underlain by the potentially coal-bearing Gething Formation, which forms a series of synclines from 3 to 8 miles wide. In the Peace River Canyon, approximately in the centre of the area, the Gething Formation is over 1,000 feet thick with at least five coal seams over 4 feet thick. The quality of the coal appears to be similar to the low to medium volatile high-grade coking-coals found elsewhere in the coalfield, but few if any unoxidized samples have yet been tested for coking properties.

WORK DONE: Regional geological studies, air-photograph interpretation, and geological mapping were carried out over a period of several months.

References: McLearn, F. H., and Kindle, E. D., *Geol. Surv., Canada,* Mem. 259, 1950; Mathews, W. H., *B.C. Dept. of Mines,* Bull. 24, 1946; Pugh, D. C., *Geol. Surv., Canada,* Paper 60-1, 1960.

DENISON MINES LIMITED (SAXON CREEK PROJECT)

By A. R. C. James

Location: Lat. 54°20′ Long. 120°10′ (93I/8E)
The coal licences extend from the Alberta boundary at Saxon Creek for 30 miles to Little Prairie Creek and for a further 20 miles from Quintette Mountain to the upper Murray River.

Licences: Two hundred and thirty-three coal licences covering 141,320 acres (220 square miles).

Access: By road from Grande Prairie, 120 miles.

Owner: DENISON MINES LIMITED, 1260, 540 Fifth Avenue SW., Calgary 1, Alta.

Description: The area under investigation is in the vicinity of Saxon Creek, a north-flowing tributary of Narraway River which joins the Narraway on the Alberta boundary. The structure of the sedimentary rocks is reported to be a monocline dipping at 45 degrees over a strike length of 12 miles. The Gething and the Commotion (Gates) Formations are both reported to contain coal seams, with the latter being the most coal-bearing. One seam, 43 feet thick, is reported to have been intersected.

Work done: Approximately 28 miles of access road was made from Sherman Meadows, Alta., up the Torrens River valley, along Saxon Creek, across Narraway River, and 5 miles northwest. Two holes were diamond drilled totalling 1,980 feet. Four seams were sampled.

CANADA WEST PETROLEUMS LIMITED

By A. R. C. James

Location: Lat. 54°40′ Long. 120°20′
The coal licences are south of the Wapiti River in the Little Prairie Creek area and in the vicinity of Omega Hill and Narraway River.

Licences: Twenty coal licences covering 12,800 acres.

Access: By road from Beaverlodge via Monkman Pass–Wapiti Lake road (90 miles) to Little Prairie Creek area, and from Dawson Creek by helicopter to the Omega Hill-Narraway area.

Owner: CANADA WEST PETROLEUMS LIMITED, Box 4183, Station D, Vancouver 9.

Description: The areas investigated are reported to be underlain in the Little Prairie Creek area by sedimentary rocks of the Gething Formation and in the Omega Hill area by the Luscar Formation.

Work done: Mapping over portions of four licences in the Little Prairie Creek area was done at a scale of 1 inch equals 1,000 feet. Approximately 3,000 feet of trenching was done in the Little Prairie Creek area. Eight coal-seam samples were taken in the Little Prairie Creek area and one in the Omega Hill area. Three miles of access road was constructed in the Little Prairie Creek area.

NORTHERN COAL MINES LIMITED and CARIBOO COLLIERIES LTD.

By A. R. C. James

Location: Lat. 53°40′ Long. 121°50′
Bowron River, 4 miles south of Purden Lake.

Licences: Northern Coal Mines Limited holds 12 coal licences totalling 7,395 acres and Cariboo Collieries Ltd. holds eight coal licences totalling 4,743 acres. The holdings of these two companies total 12,138 acres (17 square miles).

Access: By forest road from Buckhorn Lake and Francis Lake, 35 miles. Highway 16 now crosses near the north end of the coalfield.

Owners: Northern Coal Mines Limited and Cariboo Collieries Ltd.

Operator: NORTHERN COAL MINES LIMITED, 925 West Georgia Street, Vancouver 5.

Description:

The Bowron River coal seams occur in a sedimentary basin which extends over 15 to 20 square miles and is situated about 40 miles east-southeast of Prince George and south of Purden Lake. Sutherland Brown describes the structure as "a lineal basin oriented northwesterly and possibly 15 miles long by 1½ miles across." The age of the sedimentary rocks is believed to be mid-Tertiary and the maximum thickness more than 2,000 feet. Dips are steep (45 degrees) on the edges of the basin but flatten out to as little as 10 degrees toward the centre. The surface is largely mantled with overburden and the few outcrops that occur are mainly on the banks of the Bowron River. The exploration of this field was started in the 1940's, following the discovery of outcrops of coal by the river in the southwest part of the basin. Since then, exploration has continued from this general area. Two practically contiguous seams, 11 feet and 8 feet thick, dipping northeast at 45 degrees, have been opened up by more than 1,200 feet of underground workings near the west bank of the river. The coalfield has been further explored by diamond drilling, which has indicated general continuity of the seam's down dip. In the deeper parts of the basin three seams occur, 10, 11, and 8 feet thick respectively. The drilling has also indicated that, while there are some normal faults, the area is free of severe faulting. In a report to the company, Dr. J. M. Black has calculated reserves of 25 million tons of indicated and probable coal. The area explored by drilling extends about 2,000 feet down dip from the outcrops on the southwest side of the basin and about 2 miles along the strike. No actual production has yet taken place.

The coal has been classified as a high volatile "B" bituminous coal. A sample taken by the company from the middle seam (11 feet thick) in the mine workings below the zone of oxidation is reported as follows:

Inherent moisture	4.92 per cent
Ash	2.77 per cent
Volatile matter	36.5 per cent
Fixed carbon	55.8 per cent
Sulphur	0.85 per cent
Btu per pound	12,550
Free swelling index	2.5

The coal is quite hard and appears to be resistant to weathering. The coal seams and some of the adjacent shales contain a remarkable quantity of black and amber resin, and the company has been investigating possible economic uses for it.

Work done: In the coal slope section of the underground workings the landing was advanced 50 feet and the crosscut was also advanced 50 feet. One hole was diamond drilled 850 feet on Coal Licence 163. Six hundred feet of trenching was done on Coal Licences 163, 451, and 459. Coal samples were taken for analysis.

References: *Minister of Mines, B.C.,* Ann. Repts., 1948, pp. 233–240; 1967, p. 459; *Geol. Surv., Canada,* Paper 68-1, pp. 14–19.

BULKLEY VALLEY COLLIERIES LTD.

By W. G. Clarke

LOCATION: Lat. 54° Long. 127°
On Goathorn Creek, 7 miles southwest of Telkwa.

LICENCES: Six Crown-granted lots and 21 coal licences.

ACCESS: By gravel road from Telkwa.

OWNER: Bulkley Valley Collieries Ltd.

OPERATORS: FORESTBURG COLLIERIES LIMITED, until June, then BULKLEY VALLEY COAL SALES LIMITED, Box 39, Telkwa.

WORK DONE: The option agreement was terminated by Forestburg Collieries Limited in March. The company mined, treated, and sold 2,431 tons of coal in 1970; the section of the pit worked under option (approximately 14 acres) was then sloped, smoothed, fertilized, and sown to grass. In July, Bulkley Valley Coal Sales Limited, a subsidiary of Bulkley Valley Collieries Ltd., started exploration and mining. About 2,000 tons of coal was mined from a small pit on the west bank of Goathorn Creek, half a mile upstream of the screening plant. Three men were employed.

REFERENCES: *Minister of Mines, B.C.,* Ann. Repts., 1951, pp. 291–297; 1967, pp. 458, 459; *B.C. Dept. of Mines & Pet. Res.,* G.E.M., 1969, p. 422.

WESTERN COAL & COKE LTD.

By A. R. C. James

LOCATION: Lat. 54°49′ Long. 127°45′ (93L/13)
The coal licences are contiguous and are situated in north central British Columbia near the headwaters of Zymoetz River and west of Hudson Bay Mountain. Louise Lake is on the northeast edge of the property, and Coal Creek flows diagonally across the licence area.

LICENCES: Thirteen coal licences covering 7,873 acres (Western Coal & Coke Ltd.), six coal licences covering 3,373 acres (Glen Copper Mines Limited), and three coal licences covering 1,720 acres (Kaiser Resources Ltd.). Total holdings are 12,966 acres (20 square miles).

ACCESS: From Smithers by road, 25 miles.

OPERATOR: KAISER RESOURCES LTD., 10th Floor, 850 West Hastings Street, Vancouver 1.

DESCRIPTION:

In an area underlain predominantly by volcanic and sedimentary rocks of the Hazelton Group there is a small area underlain by a sedimentary sequence that apparently unconformably overlies an irregular surface of Hazelton Group rocks. Kirkham describes the sequence as including "grey mudstones, siltstones, sandstones, and conglomerates with abundant plant debris" and says that the rocks are "probably of Upper Jurassic or Lower Cretaceous age belonging to the Bowser assemblage." Outcrops of at least five coal seams occur on Coal Creek and have been intersected by diamond-drill holes in the vicinity. They occur in the lower 300 feet of sediments, the maximum thickness of which is 800 feet in drill hole No. 1. The beds are reported to strike northeasterly and to dip at 24 degrees northwest. Strike extensions are limited by faulting. Only two of the seams would be considered economic, and these are stratigraphically from 25 to 100 feet apart. The lower seam varies from 6 to 16 feet thick, being split in many places by a rock band, and the upper seam averages about 6 feet thick. Current work has indicated that the seams might be continuous under an area 2,200 by 1,500 feet. In a report dated July 7, 1969, Dr. J. M. Black computed an indicated and possible reserve of 1,492,000 tons. This would all have to be mined by underground methods. The coal is reported to border on high volatile "A" and "B" bituminous (A.S.T.M. classification), to have a high sulphur content, and to be noncoking. Thermal quality, however, is good in terms of Btu per pound. The possible area under which coal seams could occur is now said to be not more than 2 square miles.

Work done: The work consisted of exploration, geological mapping over all the licences, and stripping and trenching of the seams. Fourteen thousand feet of trenching was done and 6 miles of access road was constructed from Coal Creek to McDonnell Lake.

References: *Minister of Mines, B.C.,* Ann. Repts., 1914, pp. 206–213; 1922, pp. 111–113; 1968, pp. 469, 470.

NATIONAL COAL CORPORATION LTD.

By A. R. C. James

Location: Lat. 56°50′ Long. 128°15′ (104A/16)
The Groundhog coalfield is situated near the headwaters of the Skeena River, 80 miles northwest of Stewart.

Licences: Two hundred and twenty-one coal licences.

Access: By fixed-wing aircraft from Smithers to Kluayaz Lake, 170 miles.

Owner: National Coal Corporation Ltd.

Operators: PLACER DEVELOPMENT LIMITED and QUINTANA MINERALS CORPORATION, 700 Burrard Building, Vancouver 5.

Description: Sedimentary rocks of the Bowser assemblage (Upper Jurassic to Lower Cretaceous) outcrop over an area of several hundred square miles. Previous observers have reported intense deformation of the Bowser assemblage and complex structural features. The outcrops of a number of coal seams of anthracite and semianthracite rank have been observed. The work carried out in 1970 seems to indicate a more encouraging outlook from an economic point of view than that of previous investigators.

Work done: Approximately 200 square miles of the coalfield was geologically mapped on a scale of 1 inch equals 2,000 feet. Six holes were diamond drilled totalling 3,377 feet. These holes were drilled in the vicinity of Discovery Creek, Abraham Creek, and Telfer Creek, that is, on both sides of the Skeena River valley and centring on McEvoy Flats. Prospecting, examination of seam outcrops, and sampling were done.

References: *Minister of Mines, B.C., Ann. Rept.,* 1968, p. 470; Buckham, A. F., and Latour, B. A., *Geol. Surv., Canada,* Bull. 16, 1950.

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